

ATC CyberCabinet*



www.SreServicesLLC.com

CyberCabinet® is a trademark of SRE Services LLC v060623

CU Database Test & Validation

For Traffic Engineers, it is often a challenge to test CU control programs and visualize the results.

• The many problems they face are:

- Configuring a physical test traffic cabinet to match the on-street configuration under test
- Generating detector & preemption inputs to force CU outcomes
- Visualizing the CU signal outputs in an easily recognized format
- Validating compatibility with the CMU configuration.
- Today, their best option is bringing the actual physical cabinet to the lab with detector test switches installed (assuming loops) and connecting a generic display panel.

With intersection complexities growing, the problem will only get worse over time.



CU Database Test & Validation

If only there was an easier, cheaper, and better way to exercise and validate a new or modified CU database, then Engineers could spend more time designing and testing.

The ATC CyberCabinet[®] software provides this easier, cheaper, and better way to exercise and visualize the Controller Unit operation, without the cost and trouble of a hardware traffic cabinet.

This will produce higher quality results in less time, while reducing or eliminating the need for call-backs once the intersection is operating.



ATC CyberCabinet Software

The ATC CyberCabinet [®] program provides a traffic signal Engineer with a software based solution to test and validate the functionality of an ATC Controller Unit (CU) database operating with the actual CMU configuration, without needing a full ATC5301, NEMA TS2, ITS Cabinet, or TEES 332 Cabinet Assembly in hardware.







CU Direct Mode

The *CU Direct* mode responds to SB#1 HDLC commands from the target CU using the *ATC CyberCabinet HDLC Interface Module*.

No other hardware is needed.



A time-stamped (sniffer) Log of SB#1 command and response frames between all devices is provided for detailed trouble shooting and replay.



Cabinet Device Emulation (ATCC)

The software emulates the functionality of the ATC5301 input/output Serial Interface Units (SIU) and the Cabinet Monitor Unit (CMU2212)

• Up to seven SIUs are supported:

- Two Output SIUs
 - 32 Channels of Signals
- Five Input SIUs
 - 120 Channels of Detection
- Full 32 Channel CMU function:
 - Configured with the parameters from the actual intersection CMU Datakey
 - Broad fault coverage to confirm CU compatibility

Multiple configurations of ATC5301 cabinets are supported:

- Standard Input Assembly (24 or 48 channel)
 - Up to five SIUs for 120 Input channels
- Standard 16 Channel Output Assembly
- Standard 32 Channel Output Assembly
- Combo IO Assembly (McCain Backpack)
- NYCDOT LPLVC
- More to come



Cabinet Device Emulation (TS-2)

The software emulates the functionality of the NEMA TS2 input/output Bus Interface Units (BIU) and the Malfunction Management Unit (MMU2)

- Up to eight BIUs are supported:
 - Four T&F Output SIUs
 - 16 Channels of Signals
 - Four Input BIUs
 - 64 Channels of Detection
- Full 16 Channel MMU2 function:
 - NEMA TS2 FYA Modes A:H
 - Broad fault coverage to confirm CU compatibility

- All NEMA Standard Input and Output configurations are supported
- The MMU2 function supports Flashing Yellow Arrow configuration A thru H



Cabinet Device Emulation (TEES 332)

The software emulates the functionality of the TEES 2070 input/output Field IO Module (FIO) and the 2018KCL CMU

> 2070 FIO emulation:

- 64 Outputs
 - 18 Channels of Signals
- 64 Inputs
 - 64 Channels of Detection
- Full 18 Channel CMU function:
 - FYA Modes Standard and Compact
 - 2018KCL Broad fault coverage to confirm CU compatibility

- All TEES Standard Input and Output configurations are supported
- The CMU function supports Flashing Yellow Arrow and is configured with a Datakey or Datakey file.
- Aux File is supported for 18 channel operation



Cabinet Device Emulation (ITS Cabinet)

The software emulates the functionality of the ITS Cabinet input/output Serial Interface Units (SIU) and the Cabinet Monitor Unit (CMU212)

- Up to seven SIUs are supported:
 - Two Output SIUs
 - 28 Channels of Signals
 - Five Input SIUs
 - 120 Channels of Detection
- Full 32 Channel CMU function:
 - Configured with the parameters from the actual intersection CMU Datakey
 - CMU212 Broad fault coverage to confirm CU compatibility

- Multiple configurations of ITS Cabinets are supported:
 - Standard Input Assembly
 - Up to five SIUs for 120 Input channels
 - Output Assemblies
 - 14 Pack for 14 Channels
 - 14 Pack + 6 Pack for 20 channels
 - 14 Pack + 14 Pack for 28 channels



Software Functionality

The *ATC CyberCabinet*[®] software is intersection project based and provides two operating modes:

Device View and Map View

- The Device View is a more hardware centric view of the cabinet devices, and provides direct access to individual SIU inputs and outputs.
- The *Map View* elevates above the device level to an overhead view of the intersection, and uses active icons for detection inputs and signal outputs.





CU Direct – Device View

The target CU is the only physical device, the cabinet CMU and SIU devices are all virtualized.



Input SIU #1	CU Direct Mode
No.14 O.0 Disc.0.6 Dist.0.7 Period O.22 Dist.0.22	CU is Communicating Stop Listening CMU Status = No Faul Clear Checkboxes Capture Checkboxes Serial Log Control
Det Olis 0.52 Open Chill 0.21 Date Chill 0.22 Bate Chill 0.02 Bate Chill 0.04 Descended	Clear Serial Log
Opened 2 Opened 3 Opened 4 Opened 5 Opened 7 Opened 8 00 03 04 09 012 015 018 022 021 01 04 07 010 012 015 018 022 023 022 023	
Opened 17 Opened 19 Opened 19 Opened 19 Opened 12 Opened 13 Opened 12 Opened 13 Opened 12 Opened 13 Opened 12 Opened 13 Opened 13 <t< td=""><td></td></t<>	

Signal icons are customizable to reflect the type of movement: Thru Ball, Protected Turns, FYA, Ped, etc.



CU Direct – Map View

- A built-in Editor is used to develop an icon based overhead view of the target intersection.
- Control icons provide clickable actions for Detector inputs, Ped buttons, and Preemption.
- Traffic signal icons reflect the CU signal outputs.



Screen view of an 8-phase FYA quad map



CU Direct – Map View

Intersection photo backgrounds are also supported.







 Capture and Replay a controller sequence such as a preemption routine or CMU fault to examine for more detailed analysis.

	Replay Mode - C	X C
En	A Replay Play 2x Pause Replay	
	Replay Progress Current Record # 15743	
	Current Timestamp 04/24/2021 10:30:40.336	
	Replay Start	
	Start Record Number 15734	
	End Record Number 16733	
	Save Log Open Log Selected Replay Time = 6.1 seconds	



Serial Comm Trace Log

A Serial Bus #1 Recording function (sniffer) is provided to inspect Controller command frame sequencing

Did a preemption sequence not operate correctly? Go back and review what the Controller actually sent to the SIUs.

Trace Log & Replay capture is manually triggered or can be triggered by a CMU fault.

🖳 Seria	I Comm Trace Log - Number of Records = 500 —		×
** Requ	est Module Status, Output SIU #1 (Address = 1)		~
#20	04/24/2021 10:23:01.548 - CMD: 01,83,31,FF		
#21	04/24/2021 10:23:01.548 - RSP: 01,83,B1,00,00,00,00,00,23,5A		
** Requ	est Module Status, Input SIU #1 (Address = 9)		s
#22	04/24/2021 10:23:01.551 - CMD: 09,83,31,FF		
\$23	04/24/2021 10:23:01.551 - RSP: 09,83,B1,00,00,00,00,23,5A		
** Poll F	aw Input Data, Output SIU #1 (Address = 1)		
#24	04/24/2021 10:23:01.552 - CMD: 01,83,34		
\$25	04/24/2021 10:23:01.553 - RSP: 01,83,B4,00,00,00,00,00,00,40,18,00,00,23,5A		
** Poll F	aw Input Data, Input SIU #1 (Address = 9)		
\$26	04/24/2021 10:23:01.554 - CMD: 09,83,34		
\$27	04/24/2021 10:23:01.555 - RSP: 09,83,B4,00,00,00,00,00,00,40,90,00,00,23,5A		
** Com	and Outputs, Output SIU #1 (Address = 1)		
\$28	04/24/2021 10:23:01.557 - CMD: 01,83,37,61,12,26,49,02,00,00,00,00,00,00,00,00,00,00,00		
#29	04/24/2021 10:23:01.557 - RSP: 01,83,B7,00		
** Com	and Outputs, Input SIU #1 (Address = 9)		
\$30	04/24/2021 10:23:01.559 - CMD: 09,83,37,00,00,00,00,00,00,00,00,00,00,00,00,00		
\$31	04/24/2021 10:23:01.559 - RSP: 09,83,87,00		
** Swit	h Pack Drivers Long, CMU (Address = 15)		
#32	04/24/2021 10:23:01.641 - CMD: 0F,83,51,DD,0F,00,00,00,00,00,00,22,00,00,00,00		
\$33	04/24/2021 10:23:01.641 - RSP:		
OF,83	D1,00,00,00,00,00,00,DD,0F,00,00,00,00,00,00,00,22,00,00,00,00,00,	6E,6E,	
6E.00	EE. EE. EE. EE. EE. EE. EE. 00.00.00.00.00.00.00.00.00.00.00.00.00	00.00.	
00,00	00,00,00,00,00,00,00,00,00,00,00,00,00,	00,00,	
00.00	00.00.00.00.00.00.00.00.00.64.00.64.64.64.64.64.64.64.64.64.64.00.00.00.00.00.00.00.00.00.00.00.00.00	00.00.	
00.00	00.00.00.00.00.00.00.00.00.00.00.00.00.	00.00.	
00.00	00.00.00.00.00.00.00.00.00.00.00.00.00.	00.00.	
22.00	00.00.00		
** Send	to Local Flash, CMU (Address = 15)		
#34	04/24/2021 10:23:01.646 - CMD: 0F.83.3E.00		
#35	04/24/2021 10:23:01.646 - RSP: 0F.83.BE		
** Requ	ast Module Status, Output SIU #1 (Address = 1)		П.
			Ш
Re	capture Log Save Log Open Log	Close	



Cabinet Monitor Unit (CMU)

A 32 Channel Cabinet Monitor Unit function is provided in the *CU Direct* mode.

- Test and validate the CMU Configuration using the <u>exact Datakey</u> <u>configuration</u> for the target cabinet during Controller test & evaluation.
- Test Preemption sequences and complex movements for CMU compatibility.
- Datakey parameters can be read from a Key file on disk, or directly from the EDI *MonitorKey*[®] Programmer.

Eliminate CMU surprises when the physical cabinet is installed on the street.



MonitorKey[®] is a trademark of Eberle Design Inc.



CMU Functions

The CMU function provides the following fault coverage:



- Conflict
- Lack of Signal (LOS)
 - Dark Maps
- Multiple Signal
- Clearance
 - Minimum Yellow
 - Minimum Yellow Plus Red
- Flashing Yellow Arrow
 - FYA Flash Rate
 - R&Y Input Enable
- Virtual Channels
- Serial Bus #1 Timeout
- Local Flash



SIU Direct Mode

SIU Direct mode is used to communicate directly to a hardware SIU-2218 installed in a physical ATC cabinet.



The *SIU Direct* mode can be helpful to :

- Trouble shoot problems with a suspect SIU-2218 or assembly.
- Exercise or test an Input or Output Assembly directly without a CU installed.



SIU Direct Mode

- With the SIU IO form controls, a user can monitor the SIU IO responses to CU commands.
- The Output Control mode will bypass CU SB#1 commands and set the inputs and outputs of the target SIU-2218 directly from the manual SIU Direct form controls.

		Input SIU #1			SIU Direct M	ode
as 14 10 0 0 as 58 10 1 0 as 512 10 2 0 as 1316 10 3 0 as 12720 10 4 0 as 12720 10 4 0 as 12720 10 4 0 at Ch 2 10 7 0 at Ch 2 10 7 0 at Ch 3 10 8 0 at Ch 3 10 9 0 at Ch 5 10 10 0 ax 1 Opto 1 0	Det Ch 6 10 11 ○ Det Ch 7 10 12 ○ Det Ch 8 10 13 √ ● Det Ch 10 10 15 √ ● Det Ch 11 10 16 √ ● Det Ch 13 10 18 √ ● Det Ch 15 10 20 √ ● Det Ch 15 10 21 √ ● Det Ch 16 10 21 √ ● Det Ch 16 10 21 √ ● Det Ch 16 10 22 √ ●	Det Ch 17 Det Ch 18 Det Ch 18 Det Ch 19 Det Ch 21 Det Ch 21 Det Ch 22 Det Ch 24 Det Ch 24	Start Ch 28 10 33 0 Start Ch 29 10 24 0 Start Ch 30 10 35 0 Start Ch 30 10 35 0 Start Ch 30 10 35 0 Start Ch 31 10 35 0 Start Ch 33 10 35 0 Start Ch 33 10 35 0 Start Ch 35 10 40 0 Start Ch 35 10 40 0 Start Ch 35 10 42 0 Start Ch 35 10 43 0 Start Ch 35 10 42 0 Start Ch 35 10 43 0 Opto 4 0pto 4 0	Sar (D, 3) 0 4 ✓ Sar (D, 4) 0 45 ✓ Sar (D, 4) 0 45 ✓ Sar (D, 4) 0 46 ✓ Sar (D, 42) 0 48 ✓ Sar (D, 42) 0 48 ✓ Sar (D, 42) 0 48 ✓ Sar (D, 43) 0 49 ✓ Sar (D, 43) 0 50 ✓ Sar (D, 44) 0 53 ✓ Sar (D, 44) 0 52 ✓ Sar (D, 42) 10 54 ✓	SIU Not Responding Input Control Raw Filtered Output Control Serial Bus #1 SIU Direct Clear Checkb Capture Check Serial Log Control Display Serial Clear Serial	

Screen view of the SIU Direct mode connected to Input SIU #1



ATC CyberCabinet Software

- Test & Validate CU databases without the need for a fully populated hardware ATC Cabinet.
- Test & Validate the actual CMU Configuration programmed into the cabinet CMU Datakey.

Future-Proof your ATC Controller Development and Test program.



Contact your local ATC Cabinet supplier for more information about the *ATC CyberCabinet* [®] product.

