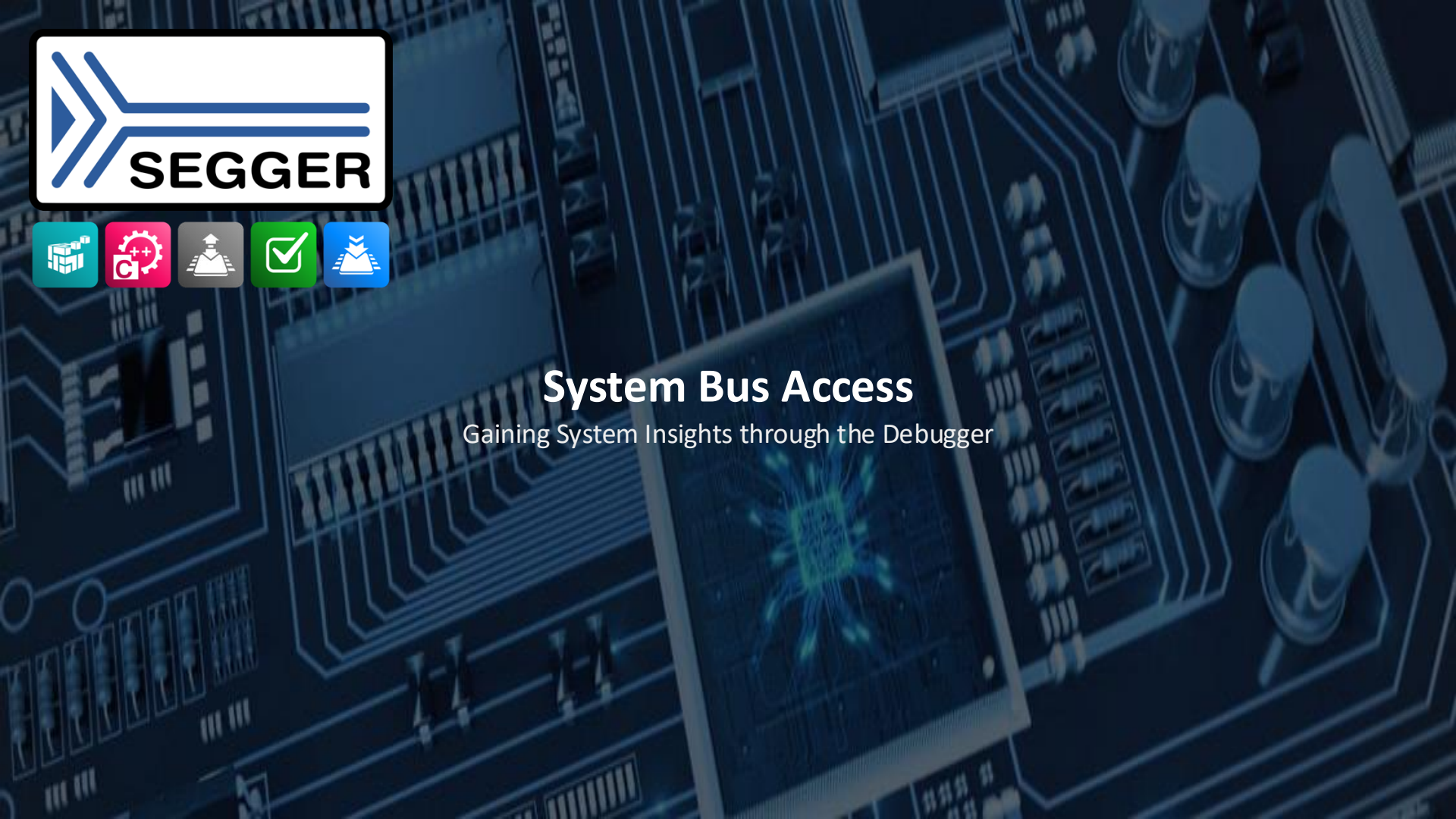


System Bus Access

Gaining System Insights through the Debugger

Johannes Lask

Product Manager & Embedded Expert

SEGGER

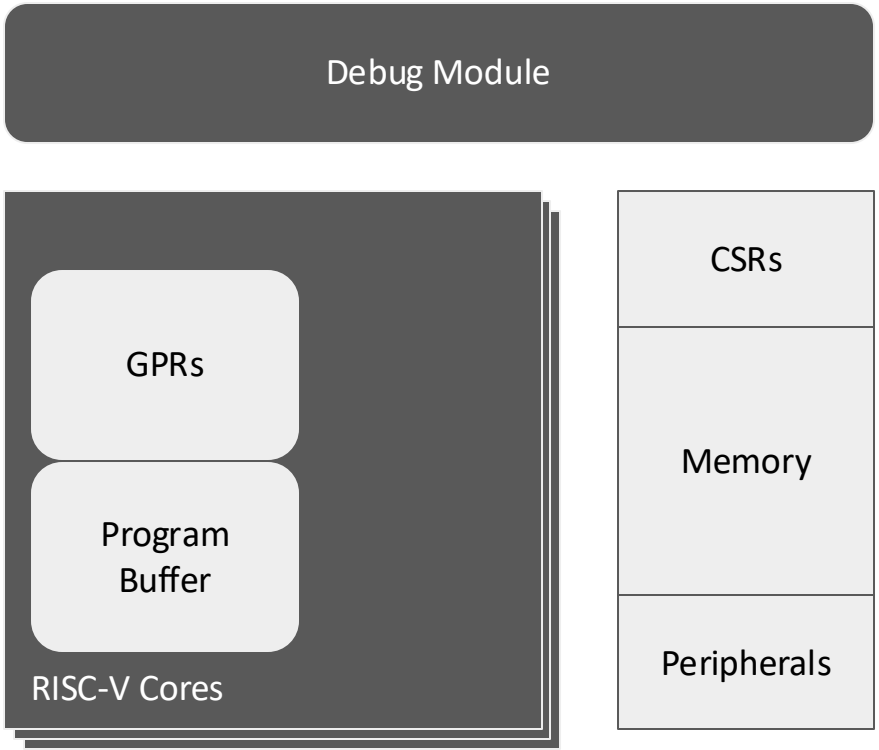
Debugging on RISC-V

X

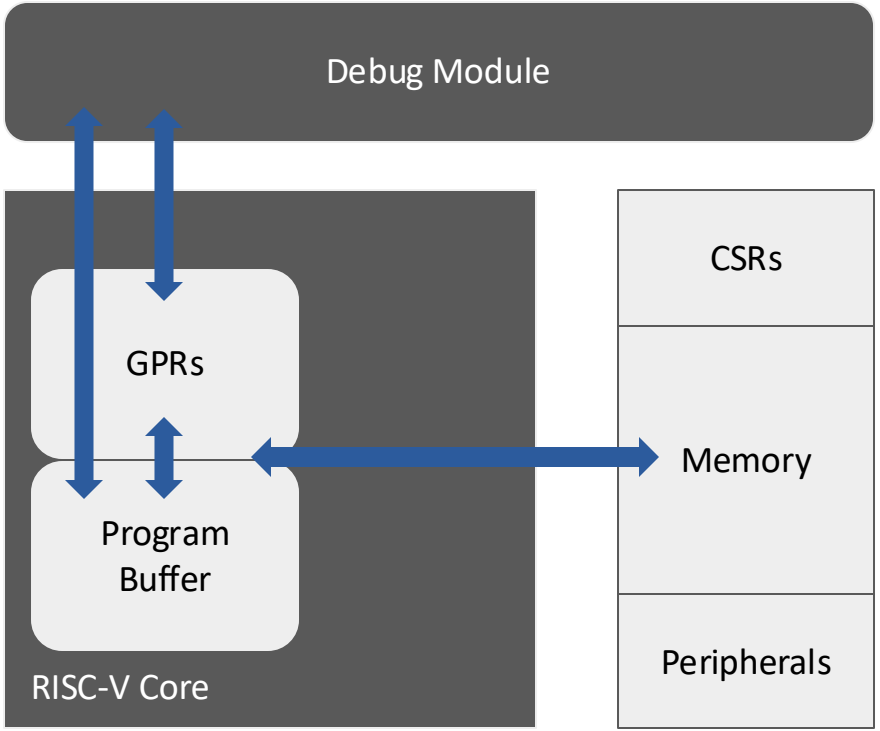
RISC-V®

- Debug Probe
- JTAG
- JTAG DTM
- DMI
- Debug Module
- RISC-V Cores

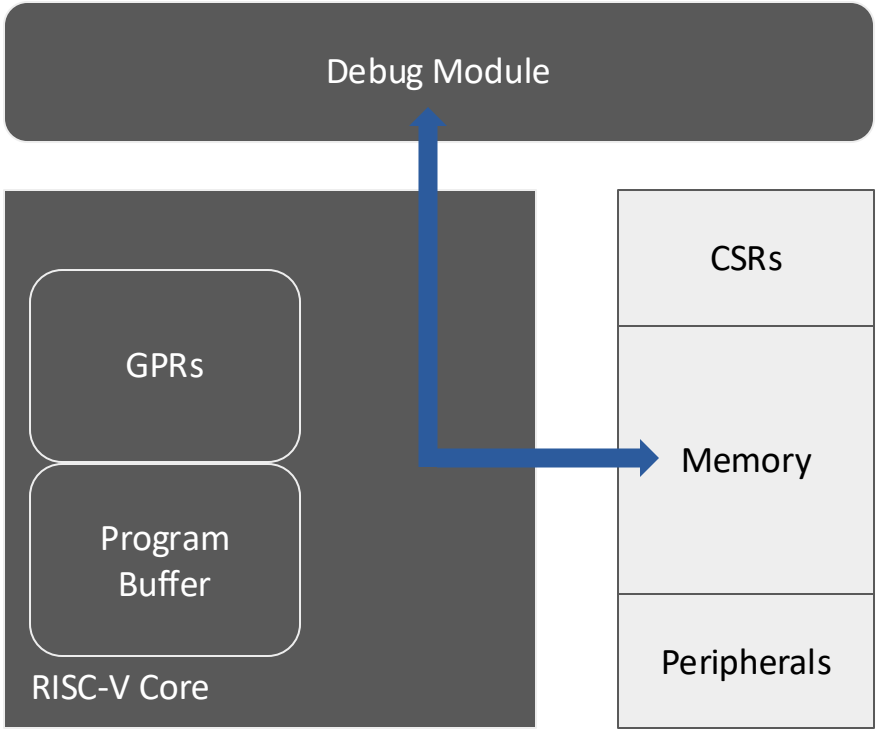
Debug Module



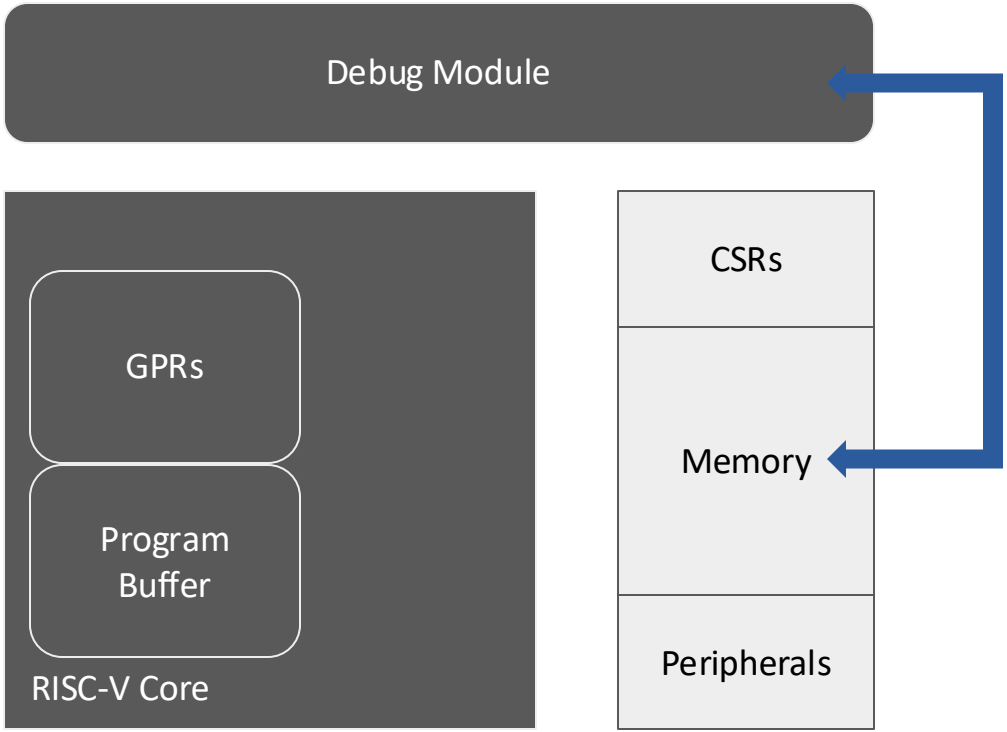
Access Register Command & Program Buffer



Access Memory Command

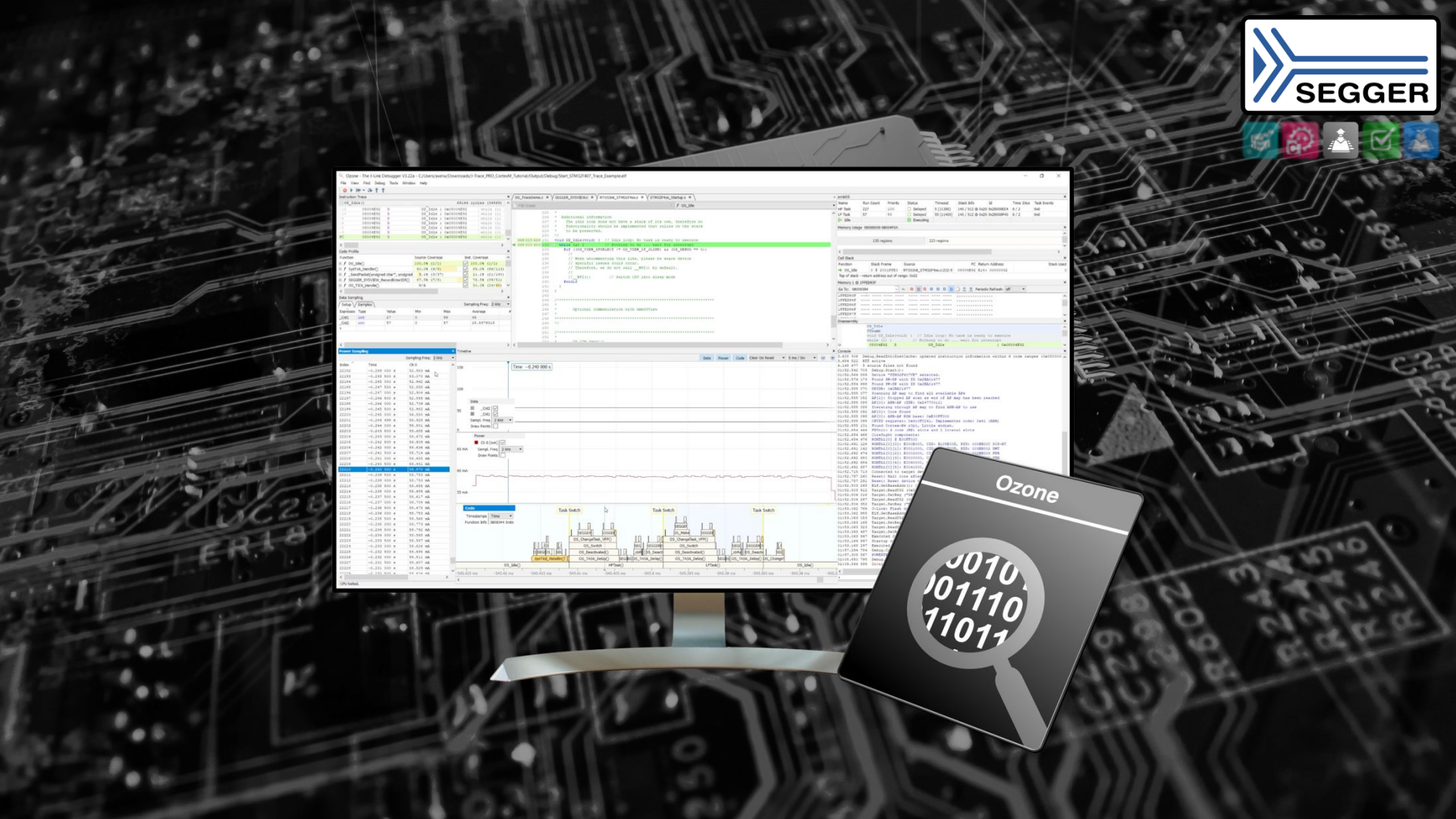


System Bus Access



Memory Access

Feature	Program Buffer	Access Memory Cmd	System Bus Access
Memory View	Core	Core	Physical
Access Rights	Restricted	Restricted	Full
Overhead	most	less	least
While Running?	No	Optional	Yes


SEGGER
Ozone
0010
01110
11011

Global Data

Name	Value	Location	Size	Type
OS_	*	*	*	*
⊞ OS_COM_pTask	0x0	2000 0EEC	4	volatile struct OS_TASK_STRUCT*
⊞ OS_Global		2000 00C8	72	struct OS_GLOBAL_STRUCT
OS_InitCalled	1 ('\001')	2000 0EFD	1	uchar
OS_InitialSuspendCnt	0 ('\0')	2000 0EF2	1	uchar
OS_InTimer	0 ('\0')	2000 0EFC	1	uchar

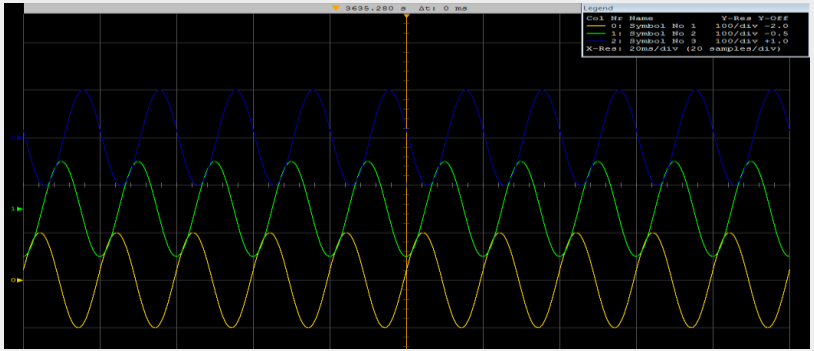
Local Data @ SetMember2

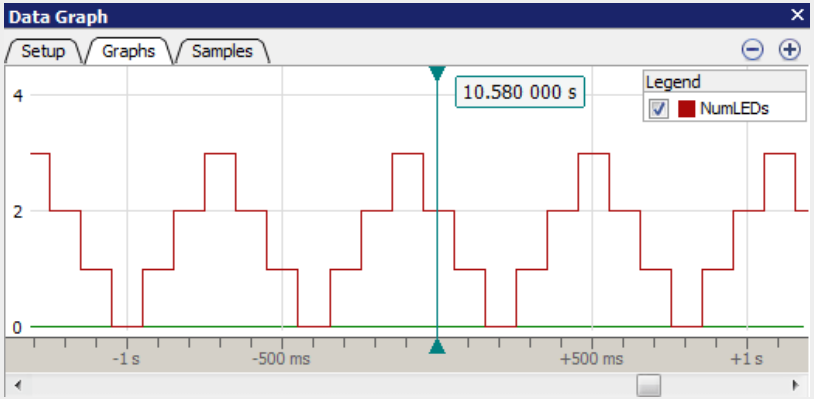
Name	Value	Location	Size	Type	Access
⊟ this	2000 4374	2000 4354	4	const class Class1*	
⊟ [0]		2000 4374	12	const class Class1	
⊞ pNext	0x0	2000 4374	4	class Class1*	protected
Member1	0xA	2000 4378	4	int	private
Member2	0	2000 437C	1	bool	private
StaticMember		<null>	4	int	private

Watched Data

Expression	Value	Location	Size	Refresh	Type
OS_Global.Time	25 790	2000 00E8	4	2 Hz	volatile long
OS_Global.Time / 1000	25	const	8	2 Hz	long long
StackHP[3]	CDCD CDCD	2000 1914	4	2 Hz	int
⊟ TCBHP		2000 1B08	88	2 Hz	struct OS_TASK_STRUCT
⊞ pNext	2000 0DAC	2000 1B08	4	2 Hz	struct OS_TASK_STRUCT*
⊞ pStack	2000 1A78	2000 1B0C	4	2 Hz	struct OS_REGS*

High-Speed Sampling



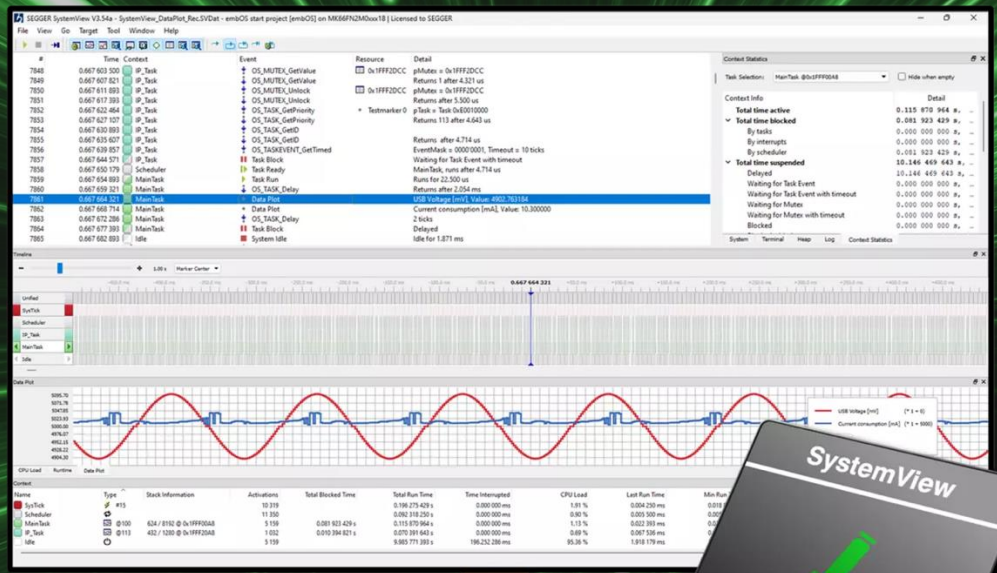


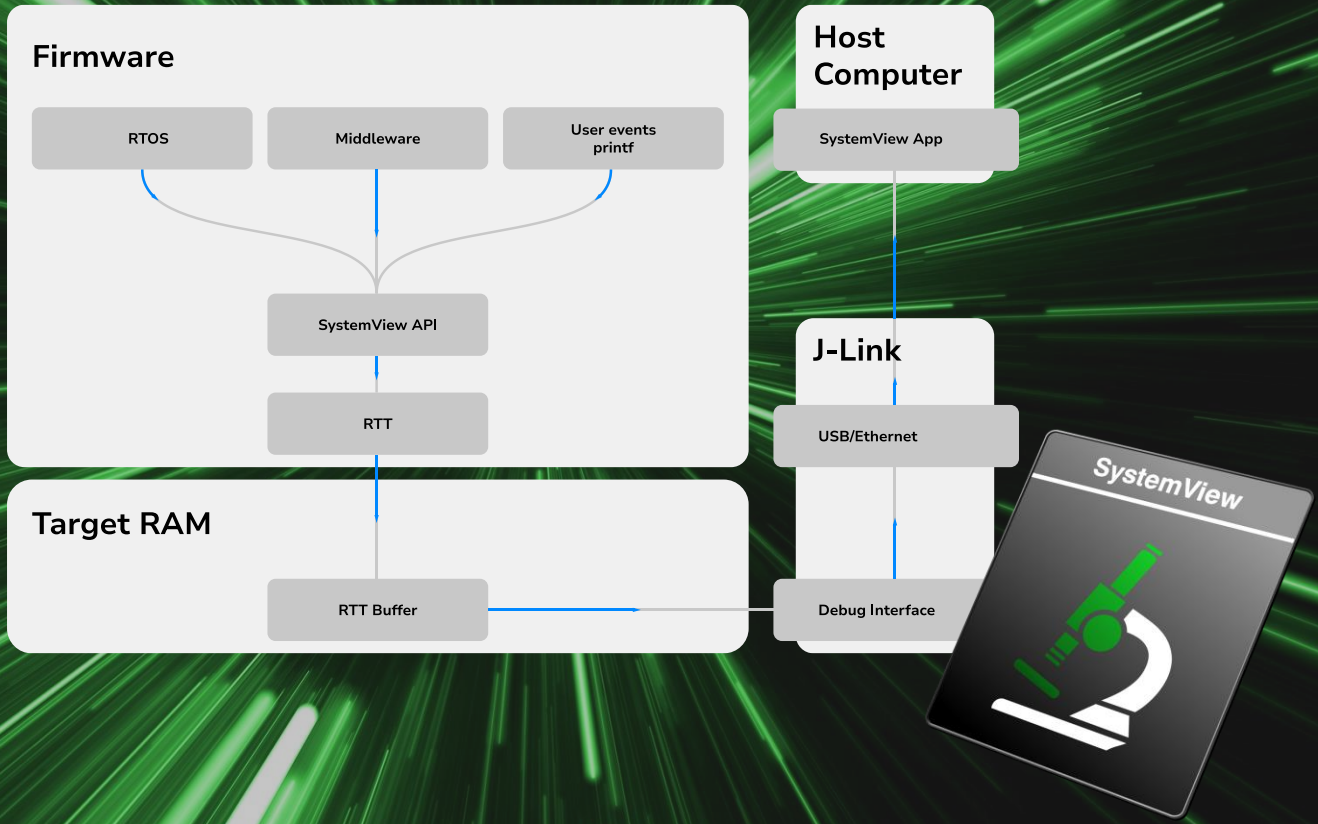
Real Time Transfer

SEGGER

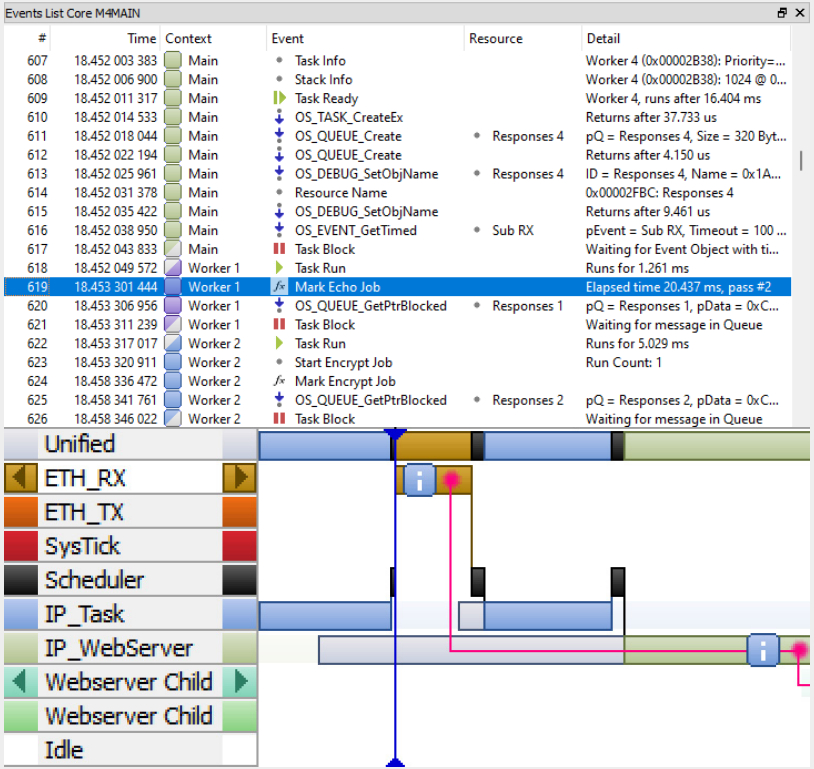
Terminal

```
- - - - - - - - - - - - - - - - - - TARGET RESET - - - - - - - - - - - - - - - - - -
>> Output via SWO active
>> Semihosting IO active
>> RTT active
MainTask   (00.000s) > Booting...
MainTask   (00.002s) >   System Initialization...
MainTask   (00.014s) >   OK.
MainTask   (00.015s) >   Memory Initialization...
MainTask   (00.251s) >   OK.
MainTask   (00.252s) >   Memory Self Test...
MainTask   (01.116s) >   OK.
MainTask   (01.117s) >   System Self Test...
MainTask   (01.350s) >   OK.
MainTask   (01.352s) > System booted.
```

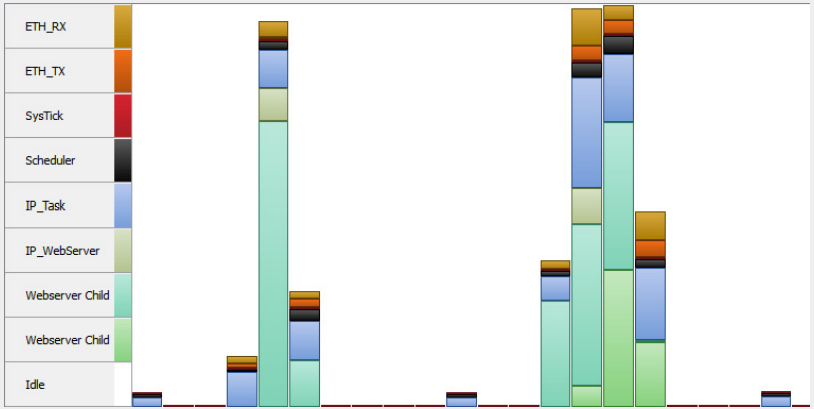

SEGGER SystemView V3.54a - SystemView_DataPlot_Rec.SVDat - embOS start project [embOS] on MK66FN2M0xxx18 | Licensed to SEGGER
File View Go Target Tool Window Help
Context Statistics
Data Plot
SystemView


Firmware
RTOS
Middleware
User events
printf
SystemView API
RTT
Target RAM
RTT Buffer
Host
Computer
SystemView App
J-Link
USB/Ethernet
Debug Interface
SystemView

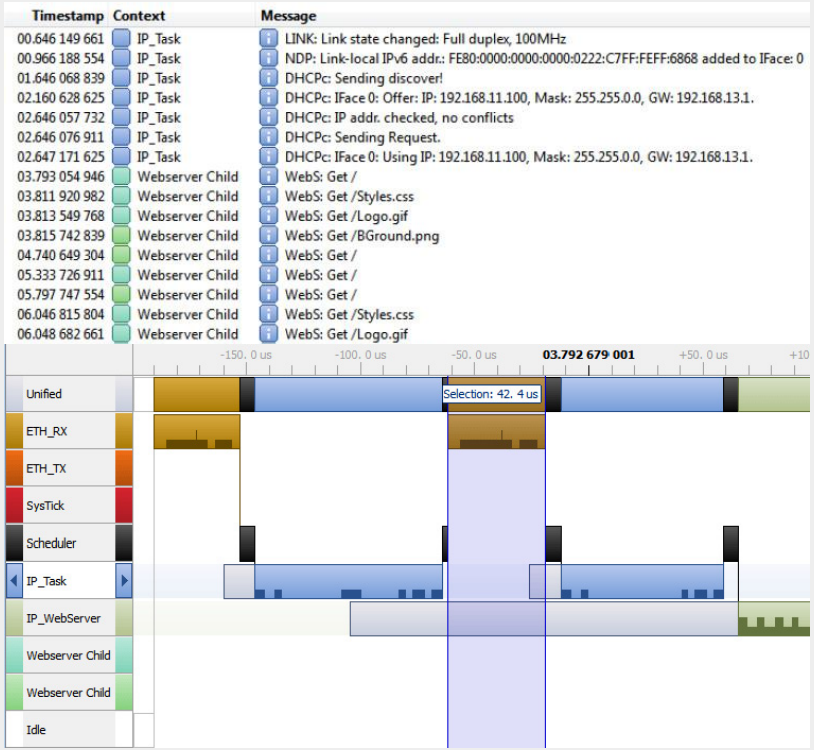
Context Runtime and Communication



CPU Load Analysis

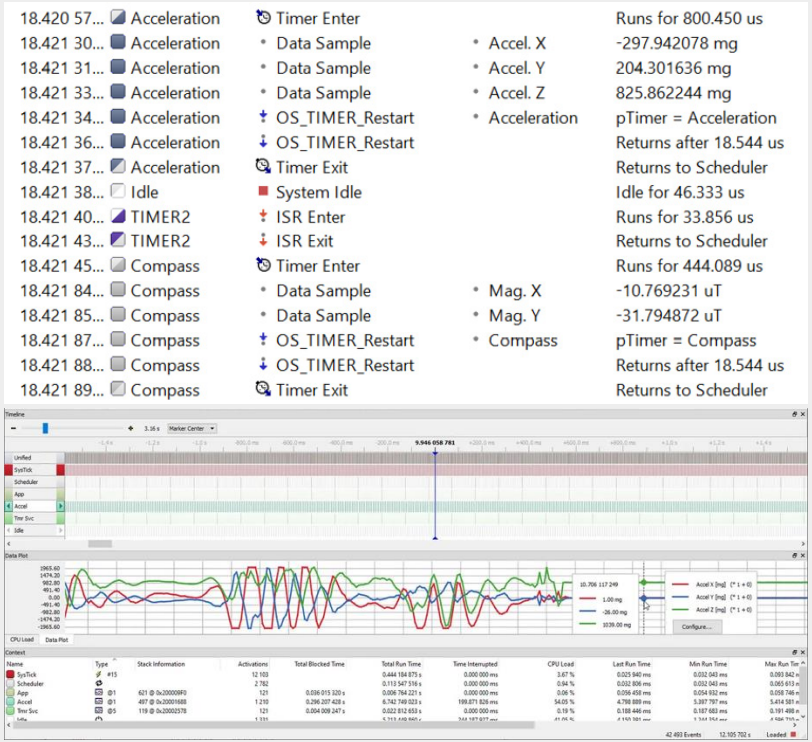


API Execution Measurement and Message Logging



Timestamp	Context	Message
00.646 149 661	IP_Task	LINK: Link state changed: Full duplex, 100MHz
00.966 188 554	IP_Task	NDP: Link-local IPv6 addr.: FE80:0000:0000:0000:0222:C7FF:FEFF:6868 added to IFace: 0
01.646 068 839	IP_Task	DHCPc: Sending discover!
02.160 628 625	IP_Task	DHCPc: IFace 0: Offer: IP: 192.168.11.100, Mask: 255.255.0.0, GW: 192.168.13.1.
02.646 057 732	IP_Task	DHCPc: IP addr. checked, no conflicts
02.646 076 911	IP_Task	DHCPc: Sending Request.
02.647 171 625	IP_Task	DHCPc: IFace 0: Using IP: 192.168.11.100, Mask: 255.255.0.0, GW: 192.168.13.1.
03.793 054 946	Webserver Child	WebS: Get /
03.811 920 982	Webserver Child	WebS: Get /Styles.css
03.813 549 768	Webserver Child	WebS: Get /Logo.gif
03.815 742 839	Webserver Child	WebS: Get /BGround.png
04.740 649 304	Webserver Child	WebS: Get /
05.333 726 911	Webserver Child	WebS: Get /
05.797 747 554	Webserver Child	WebS: Get /
06.046 815 804	Webserver Child	WebS: Get /Styles.css
06.048 682 661	Webserver Child	WebS: Get /Logo.gif

Date Plotting

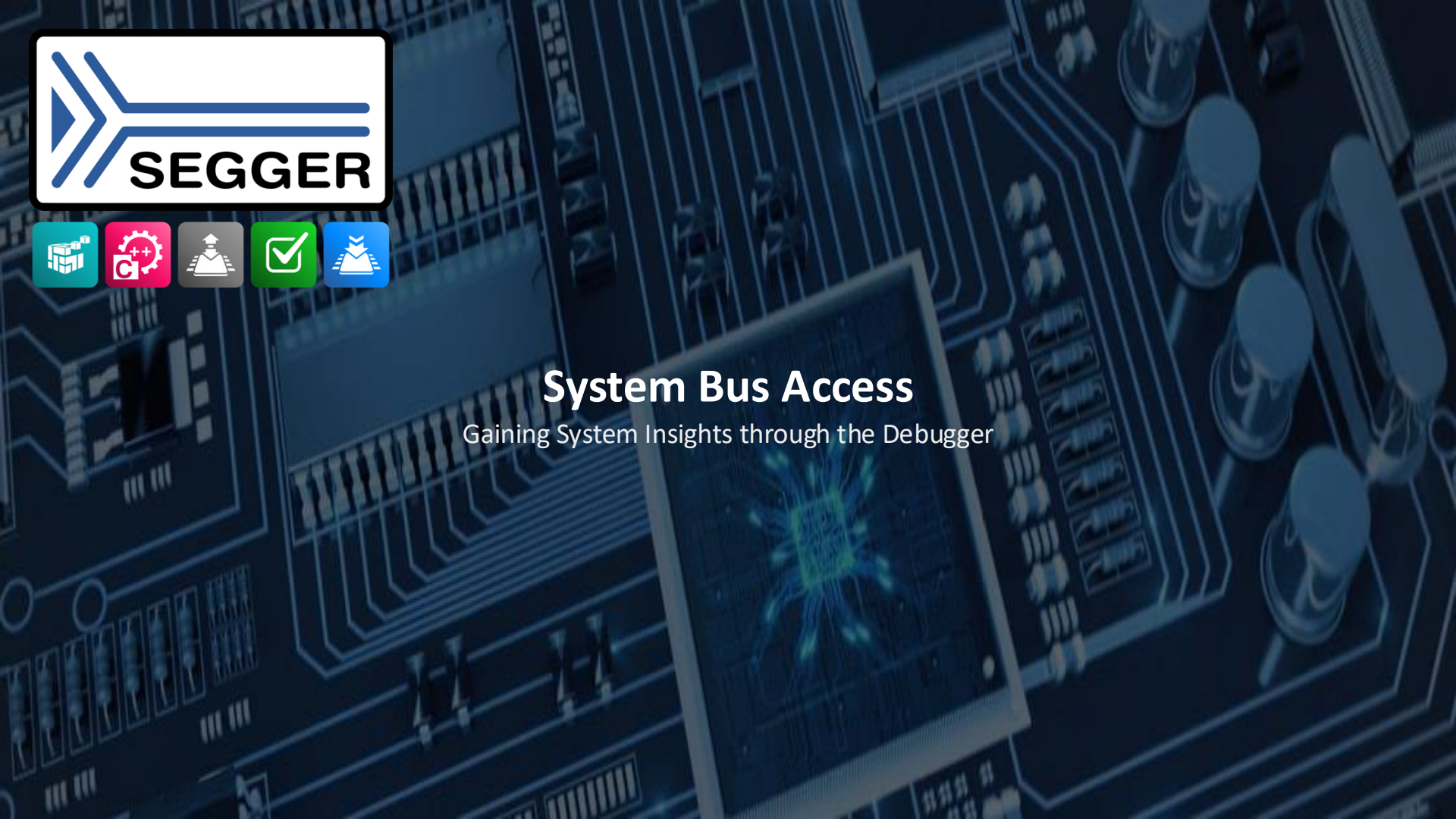


18.420 57...	Acceleration	Timer Enter	Runs for 800.450 us
18.421 30...	Acceleration	Data Sample • Accel. X	-297.942078 mg
18.421 31...	Acceleration	Data Sample • Accel. Y	204.301636 mg
18.421 33...	Acceleration	Data Sample • Accel. Z	825.862244 mg
18.421 34...	Acceleration	OS_TIMER_Restart • Acceleration	pTimer = Acceleration
18.421 36...	Acceleration	OS_TIMER_Restart	Returns after 18.544 us
18.421 37...	Acceleration	Timer Exit	Returns to Scheduler
18.421 38...	Idle	System Idle	Idle for 46.333 us
18.421 40...	TIMER2	ISR Enter	Runs for 33.856 us
18.421 43...	TIMER2	ISR Exit	Returns to Scheduler
18.421 45...	Compass	Timer Enter	Runs for 444.089 us
18.421 84...	Compass	Data Sample • Mag. X	-10.769231 uT
18.421 85...	Compass	Data Sample • Mag. Y	-31.794872 uT
18.421 87...	Compass	OS_TIMER_Restart • Compass	pTimer = Compass
18.421 88...	Compass	OS_TIMER_Restart	Returns after 18.544 us
18.421 89...	Compass	Timer Exit	Returns to Scheduler

Heap and Stack Monitoring

Heap

Time	Context	Resource	Detail
Filter		Filter	Filter
1.058 969 300	Audio Enumerator	0x03969720	Allocate 44 bytes at 0x03969720, remains in use -- 43108510 used, 91109218 free, 32.11% fu
1.065 910 600	Audio Enumerator	0x03969754	Allocate 44 bytes at 0x03969754, remains in use -- 43108562 used, 91109166 free, 32.11% fu
1.070 046 100	UI Task	0x03860100	Allocate 8 bytes at 0x03860100, will be freed by event #3872, lifespan 6.842 ms -- 4310857
1.070 049 300	UI Task	0x03860110	Allocate 8 bytes at 0x03860110, will be freed by event #3870, lifespan 6.838 ms -- 4310859
1.070 050 600	UI Task	0x03969788	Allocate 32 bytes at 0x03969788, will be freed by event #3770, lifespan 2.800 us -- 4310863
1.070 051 800	UI Task	0x039697B0	Allocate 48 bytes at 0x039697B0, will be freed by event #3869, lifespan 6.835 ms -- 4310865
1.070 053 400	UI Task	0x03969788	Free 32 bytes at 0x03969788 allocated by event #3768, lifespan 2.800 us -- 43108650 used,
1.070 053 900	UI Task	0x03969788	Allocate 8 bytes at 0x03969788, will be freed by event #3871, lifespan 6.833 ms -- 4310866
1.074 139 700	Audio Enumerator	0x039697E8	Allocate 44 bytes at 0x039697E8, remains in use -- 43108718 used, 91109010 free, 32.11% fu
1.075 112 500	MIDI Enumerator	0x03969798	Allocate 8 bytes at 0x03969798, will be freed by event #3811, lifespan 11.700 us -- 4310873
1.075 114 300	MIDI Enumerator	0x0396981C	Allocate 32 bytes at 0x0396981C, will be freed by event #3810, lifespan 9.300 us -- 4310877
1.075 123 600	MIDI Enumerator	0x0396981C	Free 32 bytes at 0x0396981C allocated by event #3809, lifespan 9.300 us -- 43108734 used,
1.075 124 200	MIDI Enumerator	0x03969798	Free 8 bytes at 0x03969798 allocated by event #3808, lifespan 11.700 us -- 43108718 used,
1.075 127 000	MIDI Enumerator	0x0396981C	Allocate 24 bytes at 0x0396981C, remains in use -- 43108750 used, 91108978 free, 32.11% fu
1.075 134 700	MIDI Enumerator	0x0396983C	Allocate 40 bytes at 0x0396983C, remains in use -- 43108798 used, 91108930 free, 32.11% fu
1.075 137 700	MIDI Enumerator	0x03969798	Allocate 8 bytes at 0x03969798, remains in use -- 43108814 used, 91108914 free, 32.11% ful
1.075 139 400	MIDI Enumerator	0x0396986C	Allocate 24 bytes at 0x0396986C, remains in use -- 43108846 used, 91108882 free, 32.11% fu
1.075 141 200	MIDI Enumerator	0x0396988C	Allocate 24 bytes at 0x0396988C, remains in use -- 43108878 used, 91108850 free, 32.11% fu
1.075 142 400	MIDI Enumerator	0x039698AC	Allocate 12 bytes at 0x039698AC, remains in use -- 43108898 used, 91108830 free, 32.11% fu
1.075 143 200	MIDI Enumerator	0x039698C0	Allocate 8 bytes at 0x039698C0, will be freed by event #3834, lifespan 2.200 us -- 43108914



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