

CSL CS468 16-Ports EPC Class 1 Gen 2 RFID Reader

User's Manual

Version 2.0.1

CSL: The One-Stop-Shop for RFID Solutions

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2 FCC Statement

FCC NOTICE: To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination is expressly forbidden. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

3 Introduction

3.1 **Product Package**

3.1.1 Basic Package Content

The reader package contains:

- CS468 reader main unit (with 16 ports antenna switching unit mounted)
- 12V switching power supply
- USB cable
- GPIO cable
- Plastic caps for connectors



3.1.2 **Product Specifications**



Fig 3-1 CS468 16-Port Reader

Features:

- ISO 18000-6C and EPCglobal Class 1 Gen 2 UHF RFID protocol compliant including dense reader mode
- 16 port reader with ultra high speed antenna switching
- Ultra long read range –12 meters with DogBone tags from Smartrac (FCC version)
- Ultra high read rate peak at 300 tags per second
- Robust performance in dense-reader environments
- Configurable parameters offer maximum throughput and optimal performance
- Supports all Gen 2 commands, including write, lock and kill
- Ethernet connectivity, with Power-over-Ethernet (PoE+ or IEEE802.3at)
- 2 mounting methods: with multiplexer box piggy-backed on top of main unit or side by side with main unit

CS468 Specifications:

Physical Characteristics:	Length: 272mm; Width: 142mm; Thickness: side-by-side
	25mm & 22mm; piggy-back – 47mm; Weight: 1.15 Kg
Environment:	Operating Temp: -20° C to 50° C
	Storage Temp: -40° C to 85° C
	Humidity: 95% non-condensing
Output Power	27dBm at RF connector (after multiplexer box)
Power:	12 Volt supplied via an AC/DC adaptor or IEEE 802.3at
	(PoE+) compliant Power Over Ethernet enabled power
	source (Max. consumption on PoE: ~ 18W)
RFID Frequency Ranges:	865 – 868 MHz, 902-928 MHz, 952 – 954 MHz bands
Interfaces	LAN TCP/IP (Configurable to use fixed IP address or
	DHCP) or USB
Maximum Tag Read Rate:	300tags/sec. (normal), 150 tags/sec. (dense reader mode)
Accessories:	• RS232 cable (main unit to antenna switching box)
	• RF coaxial cable (main unit to antenna switching box)
	• USB cable
	GPIO cable
	• 12V switching power supply
	Plastic caps for connectors
Order Code:	CS468-N
	N=1: 865-868 MHz (Europe) & 865-867 MHz (India),
	N=2: 902-928 MHz (USA),
	N=4: 922-928 MHz (Taiwan),
	N=7: 920-925 MHz (China, Australia, Malaysia, Hong Kong etc.),
	N=8: 915-922 MHz (Japan)
Restrictions on Use:	Approvals, features and parameters may vary depending on
	country legislation and may change without notice



Fig 3-1 CS468INT 16-Port Reader

Features:

- Derivative of CS468 with 3dB higher output power (30dBm)
- ISO 18000-6C and EPCglobal Class 1 Gen 2 UHF RFID protocol compliant including dense reader mode
- 16 port reader with ultra high speed antenna switching
- Ultra long read range -12 meters with DogBone tags from Smartrac (FCC version)
- Ultra high read rate peak at 300 tags per second
- Robust performance in dense-reader environments
- Configurable parameters offer maximum throughput and optimal performance
- Supports all Gen 2 commands, including write, lock and kill
- Ethernet connectivity, with Power-over-Ethernet (PoE+ or IEEE802.3at)
- With multiplexer box piggy-backed on top of main unit (Not side by side with main unit)

CS468INT Specifications:

Physical Characteristics:	Length: 272mm; Width: 142mm; Thickness: 47mm;
	Weight: 1.15 Kg
Environment:	Operating Temp: -20° C to 50° C
	Storage Temp: -40° C to 85° C
	Humidity: 95% non-condensing
Output Power	Up to 30dBm at RF connector (after multiplexer box)
Power:	12 Volt supplied via an AC/DC adaptor or IEEE 802.3at
	(PoE+) compliant Power Over Ethernet enabled power
	source (Max. consumption on PoE: ~ 18W)
RFID Frequency Ranges:	865 – 868 MHz, 902-928 MHz, 952 – 954 MHz bands
Interfaces	LAN TCP/IP (Configurable to use fixed IP address or
	DHCP) or USB
Maximum Tag Read Rate:	300tags/sec. (normal), 150 tags/sec. (dense reader mode)
Accessories:	• USB cable
	GPIO cable
	• 12V switching power supply
	Plastic caps for connectors
Order Code:	CS468-NINT
	N=1: 865-868 MHz (Europe) & 865-867 MHz (India),
	N=2: 902-928 MHz (USA),
	N=4: 922-928 MHz (Taiwan),
	N=7: 920-925 MHz (China, Australia, Malaysia, Hong Kong etc.),
	N=8: 915-922 MHz (Japan)
Restrictions on Use:	Approvals, features and parameters may vary depending on
	country legislation and may change without notice

4 Hardware Installation

4.1 Hardware Content of Shipment Package



Figure 4-1 Packing Content

4.1.1 CS468 Reader

The CSL CS468 16-Port RFID Reader is an EPCglobal Class 1 Gen 2 integrated reader product.



Figure 4-2 CS468 Reader Side View



Figure 4-3 CS468 Reader Side View



Figure 4-4 CS468 Reader Side View



Figure 4-5 CS468 Reader Side View

4.2 CS468INT Reader

The CSL CS468INT 16-Port RFID Reader is an EPCglobal Class 1 Gen 2 integrated reader product.

Please DO NOT dismount the multiplexer box when use.



Figure 4-7 CS468INT Reader Side View

4.3 **Operating Setup**

On CS468, there are 2 cables have to be connected between the reader main unit and the antenna multiplexer: the RF cable and serial control cable.



CS468 has two power up modes: 12V power supply mode and PoE mode.

For 12V power supply mode, the connection diagram is as below:



Figure 4-6 12V power supply Setup



For PoE power supply mode, the connection diagram is as below:

Figure 4-7 POE adaptor Setup

The reader is connected to a PoE-enabled switch or a PoE adaptor's output port. The input port of PoE adaptor is connected to a host computer.

4.4 Cable Connection for CS468

4.4.1 Antenna Cable Connection for CS468

The CS468 reader has 16 antenna ports for connection up to 16 different mono-static antennas. Please make sure the antenna ports are connected properly before running the application program to active the port.



For connecting CS468 to different CSL antennas, you need different type of antenna cable as below:

Antenna Model	Cable Model #
CS771 / CS772 / CS777 / CS778	CS811-1M
	(RP SMA Plug – RG223 – RP TNC Jack)
CS713	CS810-1M
	(RP SMA Plug – RG223 – SMA Plug)
CS790	CS812-1M
	(RP SMA Plug – 2.8CBL – SMC Plug)

4.4.2 GPIO Cable Connection for CS468

Pin Assignment:

The pin assignment of the GPIO cable (DB-9 to open wires) come in the package is as below.

Connection

2	GPO0	Yellow
3	GPO1	Green
4	GPI1	Red
5	GPI0	Blue
8,9	GND	Black

Note:

1. Double Shielding (AL foil + copper braid)

Electrical Specification:

					UNIT
			MIN	MAX	UNIT
V		Operating	1.65	3.6	V
VCC	Supply voltage	Data retention only	1.5		v
		V _{cc} = 1.65 V to 1.95 V	0.65 × Vcc		
VIH	High-level input voltage	V _{cc} = 2.3 V to 2.7 V	1.7		V
		V _{cc} = 2.7 V to 3.6 V	2		
	Low-level	V _{cc} = 1.65 V to 1.95 V	0.	35 × V _{CC}	
VIL		V _{cc} = 2.3 V to 2.7 V		0.7	V
	mpar ronago	V _{cc} = 2.7 V to 3.6 V		0.8	
VI	Input voltage	12. E	0	5.5	٧
Vo	Output voltage		0	Vcc	V

DADAMETED	FROM	TO	N.	$T_A = 25^{\circ}C$		-20 TO	50°C	LINIT		
PARAMETER	(INPUT)	(OUTPUT)	Vcc	MIN	TYP	MAX	MIN	MAX	UNIT	
· · · · ·			1.5 V	1	7	14.4	1	14.9	- -	
				1.8 V ± 0.15 V	1	5.9	10.4	1	10.9	с
t _{pd}	А	Y	2.5 V ± 0.2 V	1	4.2	7.4	1	7.9	ns	
			2.7 V	1	4.2	6.7	1	6.9		
			3.3 V ± 0.3 V	1.5	3.9	5.7	1.5	5.9		

Example Circuits:

CS468 GPIO Connection Example – Simple Circuit

GPIO port can be connected in the following way with LED, switch and resistor.





CS468 GPIO Connection Example – Optical Coupler

GPIO port can be connected in the following way with optical couplers, switch and resistor.



4.4.3 CSL GPIO Board

CSL GPIO board can be used for connecting the CS468 GPIO port to control external devices. The connection is as below. Please refer to the "CSL GPIO Board Connection Guide" for details.



Connection with CSL GPIO Board

The CSL GPIO board can be used for connecting the CS468 GPIO port to control external devices. Please refer to the special note "<u>Use of CSL RFID Reader GPIO Control with C# Native</u> <u>Demo Program</u>" for details.

4.5 **Reader Mechanical Mounting**

The mechanical drawing of the CS468 reader is as below:



5 Software Installation

5.1 Software Content of Shipment Package

The CSL Reader software package can be downloaded from the CSL website (<u>http://www.convergence.com.hk</u>) > "Downloads & Support" area.

For General User

1.	User's Manual
2.	 Demo Applications (Installer) Dot Net C# (for Single and Multi-Reader), Windows OS Java (for Single and Multi-Reader), Windows OS CSL Adaptor for Rifidi Edge Server (for Multi-Reader), Windows OS C (for Multi-Reader), Linux OS
3.	 Special Notes Ethernet Connection Problems and Handling Methods Use of Network Protocol Analyzer (Packet Sniffer) – Wireshark Use of CSL RFID Reader GPIO Control with C# Native Demo Program Set CSL RFID Reader to Bootloader Mode and Factory Default IP Configuration Setting using Hardware Reset Button
4.	 Firmware, Upgrade Tool and Guideline Firmware Upgrade Procedure Firmware Upgrade Tool Firmware for RFID Processor Firmware for Network Processor

For Developer

1.	User's Manual
2.	Demo Applications (SDK) Dot Net C# (High Level API for Single and Multi-Reader), Windows OS Java (Low Level API for Single and Multi-Reader), Windows OS
	- CSL Adaptor for Rifidi Edge Server (Low Level API for Multi-Reader), Windows OS
	- C (Low Level API for Multi-Reader), Linux OS
3.	Reference Manual
	 C# Unified API Reference Manual Low Level API Manual
4.	Special Notes
	- Ethernet Connection Problems and Handling Methods
	- Use of Network Protocol Analyzer (Packet Sniffer) – Wireshark
	- Use of CSL RFID Reader GPIO Control with C# Native Demo Program
	- Set CSL RFID Reader to Bootloader Mode and Factory Default IP Configuration Setting using Hardware Reset Button
5.	Firmware, Upgrade Tool and Guideline
	- Firmware Upgrade Procedure
	- Firmware Upgrade Tool
	- Firmware for RFID Processor
	- Firmware for Network Processor

5.2 PC Side Prerequisites

To run the CS468 application programs, the PC must have the following software installed:

1) Dot Net Framework 3.5 or above

It is available in Windows 7 or above and it is downloadable from Microsoft website.

5.3 Default Ex-Factory IP Settings

CS468 is shipped out with the following default ex-factory IP settings:

Reader IP address:

IP = 192.168.25.203 Subnet Mask = 255.255.255.0

For the first connection to it, one can use a PC or a laptop, set it to the IP address in the same subnet (e.g. 192.168.25.141 with subnet mask 255.255.255.0), then run the Demo Application in the CS468 document package. On the applications, one can change CS468's IP address. This is described in the next section.

5.4 Changing IP Address

After initial unpacking and connecting to the CS468 reader using the default ex-factory device and PC server IP address, the system integrator will need to change the IP address of the CS468 reader to the actual IP address at the site.

The IP Address of the reader can be changed using the Demo Application "C# Native Single Reader on Windows OS with User Interface".

5.5 Demo Application - "C# Native Single Reader on

Windows OS with User Interface"

5.5.1 Hardware Setup

The only external hardware connections required by the CS468 are power and a connection to a network (Ethernet).

- 1. Connect the CS468 to the network with Ethernet cable.
- 2. Power up the CS468.

3. If success, the "RFID" LED of the available device will be turned on.

5.5.2 Software Setup

After the hardware setup, open the Demo Application "C# Native Single Reader on Windows OS with User Interface". The utility provides the following functions:

- Search for available CS468 in the network.
- Change the CS468 IP address and device name.
- Change the TCP timeout value.
- Update the CS468 Firmware (Bootloader + Application for RFID Processor and Network Processor).
- RFID operations (Inventory, Read / Write, Search, Lock, Kill, GPIO Control etc.)

Note that you have to open the port numbers 1515 and 1516 (or turn off firewall) for reader auto-discovery function to work properly.

Search Device	
Press "Search" button to search all CS203 in the same subnet:	
Search 192.168.25.203	Bootloader
Connoct Direct Search Apajgnment	Clear

Fig. 5-1. Demo Application - C# Native Single Reader

5.5.3 Search CS468

- 1. Press the "Search" button.
- 2. Available CS468 reader on the same subnet will be listed as shown in Fig. 5-2.
- 3. To direct search a reader on another subnet, enter the IP address of the CS468 in the IP box, check the "Direct Search" option and click "Search" button.

Search Device(CS468 Callback Demo v2.0).137)
	192.168.25.166 00:16:41:E0:4E:7C
CS468 Test Image V2.18.8	192.168.25.207 00:0B:3C:06:31:E5
CS468-2 RFID READER Image V2.18.8	192.168.25.203 00:05:7B:82:00:1E
	la se l'asses all se alle se la trans
Press "Connect" or	Assignment or other buttons.
Stop 192.168.25.203	Image Bootloader
Connect Direct Search	Assignment

Fig. 5-2. Searching CS468

5.5.4 Assign CS468 IP and TCP Timeout

- 1. Select the available CS468 device. The selected one will be highlighted by a black border.
- 2. Press the "Assignment" button.
- 3. Change the CS468 device name, IP address, subnet mask, gateway and trusted server IP and press "Assign".
- 4. "TrustedIP" is the IP address of the server for controlling CS468. Once this "Trusted Enable" is selected, only this trusted server can control the CS468.
- 5. After that, the network configuration of the device is set.

S Assignment								
Device Name CS468-2 RFID READER								
CS203 IP	192		168		25		203	
Subnet	255		255		255		0	
Gateway	255		255		255		255	
TrustedIP	0		0		0		0	
DHCP Retry								
		,	Assign					

Fig. 5-3. Assign IP

5.5.5 Status Verification

The status of the reader, the PC software, and the network link in between should be constantly monitored. The following are the methods:

- 1. PC server side IP configuration: run command prompt and then run "ipconfig". Make sure the PC IP address is in the same subnet as the CS468.
- CS468 reader side IP configuration confirmation: run command prompt and then run "ping 192.168.25.203" (or any other IP address that you have already assigned to the CS468 reader).
- 3. Socket status: run command prompt and then run "netstat -na"
- 4. Reader read tag capability: put a reference tag (tag with an ID that you know a priori) on an antenna connected to the CS468 reader. Reference tag is actually an excellent idea to check the health of a reader. The backend system should monitor the presence of this ID. If this ID is seen, then the reader is still alive and well.

5.6 **Exception Situations**

The following are standard exception situations:

- 1. CS468 reader is turned off and on for
 - 1. Very short time: due to power spikes
 - 2. A few minutes or more, due to site maintenance or other regular site electrical operations
- 2. PC side software is turned off and on for
 - 1. Very short time, due to manual software application reset
 - 2. A few minutes or more, due to site PC OS maintenance or other regular site PC server hardware maintenance

5.7 Finding a "Lost" CS468

Sometimes, the operator may have changed the IP address of CS468 and then forgot what it is. In that case the user can use the auto-discovery function of the Demo Application to search for the CS468.

1. Hardware Setup

The only external hardware connections required by the CS468 are power and a connection to the network.

- 1. Connect the CS468 to a network with Ethernet cable. Please note that you may need a "Crossover" Ethernet cable for connecting the reader to a computer directly. For connecting it to a switch/router, it depends on whether the switch/router's network port supports auto-switch to handle crossover cable (Auto-MDI/MDIX). If not, then a straight cable is needed.
- 2. Power up the CS468.

2. Software Setup

After the hardware setup, open the Demo App. The utility provides the following functions:

- 1. Search for available CS468 in the network.
- 2. Change the CS468 device name and IP address.
- 3. Change the TCP timeout value. (best set to zero)
- 4. Update the CS468 Boot Loader and Image to newer version.
- 5. RFID operations demo

Note that you have to open the port numbers 1515 and 1516 (or turn off the firewall) for reader searching function to work properly.

Search Device	
Press "Search" button to search all CS203 in the same subnet.	
Search 192.168.25.203	Bootloader
Connect Direct Search Asseignment	Clear

Fig. 5-4. CS468 DEMO APP

3. Search CS468

- 1. Press the "Search" button.
- 2. Available CS468 devices will be listed as shown in Fig. 5-5.
- 3. To direct search a reader on another subnet, enter the IP address of the CS468 in the IP box, check the "Direct Search" option and click "Search" button.

🚳 Search Device	
CS203 RFID READER Image V2.18.4	192.168.25.156 00:05:7B:77:00:57
Press "Connect"	or "Assignment" or other buttons.
Stop 192.168.25.2	203 Image Bootloader
Connect 🗌 🗆 Direct Search	Assignment Clear

Fig. 5-5. Searching CS468

4. Assign CS468 IP and TCP timeout

- 1. After that, you could re-assign the IP address to the reader as you want. Select the available CS468. The selected one will be highlighted by a black border.
- 2. Press the "Assignment" button.
- 3. Change the CS468 IP, subnet mask, gateway and trusted server IP and press "Assign".
- 4. "TrustedIP" is the IP address of the server for controlling CS468. Once this "Trusted Enabled" is selected, only this trusted server can control the CS468.

🗟 Assignment 🛛 🔀								
Device Name CS468-2 RFID READER								
CS203 IP	192		168		25		203	
Subnet	255		255		255		0	
Gateway	255		255		255		255	
TrustedIP	0		0		0		0	
☐ Trusted Enable DHCP Retry								
			Assign					

Fig. 5-6. Assign IP

6 C# Demo Application Program Operation

6.1 Searching for CS468 device

Search Device : C# Native Library; Demo App Vers 3	1:87; CSLib Vers 3.0.56	State of Lot of	
Proc	"Caarab " button to source a	II Booder in the same subget	
	PC Info	Treader in the same subject	Upprade
Search 192.168.25.203	IP1 192.168.25.158 Mask	255.255.255.0	Helivork Processor Application
Connect 📄 Direct Search	IP3 Mask	Clear	Network Processor Boolloader

Click "Search" button to search device in the same network.

C\$468-4 INT B	192,168,25,205,2	255 255 255 255 255 255 2	55.255.255	
image V2 18 40	00.057B 82 02 8	5		
S5113 RTLS Master Anchor	192.168.25.240, 2	255.255.255.0, 192.168.	25.2	
irmware application V1.1.16.21 (Warning : Pleas	00:08:3C:05:5F:8 se check reader netwo	35 ork setting)		
	Press "Connect" or	"Assignment" or other t	outtons.	
	Press "Connect" or PC Info	"Assignment" or other t	puttons.	Upgrade
Stop 192, 168, 25, 203	Press "Connect" or PC Info IP1 192 158.25.180	"Assignment" or other t Mask 255,255,255,0	outtons.	Upgrade History & Processour Abbrican
Stop 192.168.25.203	Press "Connect" or PC Info IP1 192 168.25.180 IP2	"Assignment" or other t Mask 255,255,255,0 Mask	outtons.	Upgrade Historick Processes Alguliand

Choose specific device to connect.

If you can't find any device, please check the following:

- i. make sure the Dot Net Framework 3.5 is installed
- ii. Disable the firewall setting on the PC or network (or open the port number 1515 and 1516)
- iii. Reboot the CS468 device

6.2 Network Configuration of CS468

After you have found a CS468 device, you can configure the target device IP address (DHCP or static IP), Device Name and TCP timeout in "Assignment".

Assignment								
Device Name CS468-4 INT B								
IP	192		168	•	25		205	
Subnet	255		255	1123	255		255	
Gateway	<mark>25</mark> 5		255		255		255	
TrustedIP	0	÷	0		0		0	
DHCP Retry 0 🔄 DHCP Enable								
		- J	Assign					

Note: Set TCP timeout to be zero at this moment.
6.3 Connecting to CS468

In order to connect to a CS468 device, select the device on the list and click the "Connect" button.

C \$468-4 INT B Image V2 18.40	192 168 25 205, 25 00 05 7B 82 02 85	55.255.255.255, 255.256	5.255.255	
C S5113 R TL S Master Anchor Firmware application V1.1 16.21 (Warning: Pleas	192.168.25.240, 25 00.0B.3C.05.5F.85 e check reader network	55.255.255.0, 192.168.2 (< setting)	52	
	Press "Connect" or "/	Assignment" or other bu	utions.	
Stop 192.168.25.203	Press "Connect" or "/ PC Info IP1 192158.25.180	Assignment" or other bu Maek 255,255,255,0	uttons. Upgrade Assignment	pylication

Choose a device and click "Connect" button.

6.4 Main Menu

In the main menu of the Demo Application program, the configuration information of the reader is shown and you can select the various functions.

	TP = 192.168.25.2	14, MAC = RFE2132PP0332	
Inventory tags	Inventory	PC Side Version:	
Read and write tags	ReadWrite	C# Native 3.0 Demo App Vers 3.1.87	Demo Application Version
Write without choose tag	WriteAny	CSLib Vers 3.0.56	CSLibrary Version (RFIDXP.DLL)
Search Tag	Geiger	Reader Side Version:	
Lock Tag data	Security	RFID Firmware Vers 1.5.27	RFID Processor Applicaton Version
Kill Tag	Kill	Network ProcBootLoader 2,9.03 Network Proc 8051 App 2,18,38	Network Processor Bootloader Version Network Processor Application Version
CS9010 Demo	C \$9010	Frequency Profile : ECC	Frequency profile currently setting
Cold Chain Demo	CaldChaim	Frequency : Hopping	Frequency Hopping
Monzo 40T Domo	ColdChain	Profile : 2	Link Profile 2 is using
Monza 4Q1 Demo	Monza4QT	Power : 300	Power Level (300 = 30dBm)
G2iLM Demo	G2iL/M	Device Type : CS203	API Mode communicating with Reader
G2iLM Func Demo	G2il Eunc	Interface : IPV4	
UCODE7 Demo	UCODE7	Config File Path : C:\Users\steve.tsoi\Documents\CSLReader	Destination Path where the reader configuration is saved
Set Hardware Com. Interface	Set Interfac		
	Set API Mode		
Temperature Monitoring	Temp Mon		
GPIO Control (Sync)	InvGPIOSyn		
GPIO Control (Async)	InvGPIOAsyn		
TID Bank Demo	TID Demo		
Channel Setup	Setup		
Exit program	Exit	CONVERGENCE SYSTEMS LIMITED	

6.5 Inventory

This page demonstrates the tag inventory functions for reading tags continuously with the RSSI value and read count.

Click the "Run" button to start reading tags.

g 19 = 15	12-108-23-203, 5	erial = KFE2132	PRUSSZ			Constant of					Control
sden	PC	XFC_W1	XFC_W1	The statements and statem	TD	USER	REA	Cours	Astenza Port	CRC16	😣 Run
											😣 Run Once
		6	11: -1- 4 -	Calera ta							Stop
		C	lick to	Column to	sort the co	ntent					O Select
											E Save
											Clear
											ClearCour
											C Exit
											Group tags fro
											Save Log
											Read TID
											0
											1
											Read User
											0
											1
											🔄 Save Tag Log FileSize (MB) 5
											StopAfterFiles 10
											File format
											Log File Path
											C:\Users\steve.tsoi \Documents \CSLReader
Tag r	ead = 0	Rate = 0 T	ag/s CRC) = 0 Tag/s							



6.6 Read / Write

This page demonstrates the function of reading and writing different memory banks of a selected tag.

1. Click on the "Search" to scan for and select the tag you want to access.



2. Select the tag on the list

1.Select T	ag 2.Read Tag 3.Write Tag Exit	
PC	EPC	\sim
3000	AD431666000000000000013	
3000	AD8A20004556D78D1A000085	
3400	E2003412DC030119513911FF	
300E	EEEE33B2DDD906C000000DD	
3000	AD8A2000455675901A00007B	
3000	AD7712001CF38B7A1D000055	
		\sim
Searc	E2003412DC030119513911FF	<u>CLR</u>

3. **Read the tag**: After the tag is selected, you can click the "2. Read Tag" tab to read the memory banks of this tag.

1.Select Tag 2.Read Tag 3.Write Tag Exit				
PC	<u>3400</u>		2	
EPC	E2003412	DC030119513911FF	-	
ACC PWD	<u>Unread</u>		-	
🗹 KILL PWD	<u>Unread</u>		- 2	
🗹 TID-UID	<u>Unread</u>	<u>Offset=0, Word=2</u>	-	
USER	<u>Unread</u>	<u>Offset=0, Word=1</u>	-	
Access Password	000000	00		
Read				

4. Click on the "Read" button to read all the memory banks.

1.Select Tag	2.Read Tag	3.Write Tag Exit	
PC	<u>3400</u>		۲
EPC	E200341	2DC030119513911FF	۲
ACC PWD	1111111	1	۲
KILL PWD	000000	0	۲
🔽 TID-UID	E200341	2 Offset=0, Word=2	٢
USER	FFFF	<u>Offset=0, Word=1</u>	٢
Access Passivi	ord 00000	000	
Heccos Passw			
Read	V	Read done!!!	

5. For the "TID-UID" and "User Memory" banks, you could also change the offset word and length of words you want to read. Click on the red lines and change values. After entering the "Offset" and "Word" (in terms of words), click the "Read" button to read the tag.

1.Select Tag	2.Read Tag	3.Write Tag	Exit	1				
PC	<u>3400</u>				\odot			
EPC	E200341	2DC0301195	<u>513911</u>	<u>FF</u>	\odot			
ACC PWD	1111111	1			\bigcirc		Configura	ation
KILL PWD	000000	0			\odot	Offset	0	÷
V TID-UID	E200341	2 Offset=0,	Word=	2	\bigcirc		lad	
USER	FFFF	Offset=0,	Word=		\odot	Word	34	Ŷ
						OK		Cancel
Access Passw	ord 00000	000						
Read]	Read dor	ne!!!					

If the length of the user memory read is too long to be displayed on screen, click on the data and it will expand to display all the data.

1.Select Tag 2.Read Tag 3.Write Tag Exit	1.Select Tag 2.Read Tag 3.Write Tag Exit
✓ PC 3400 ✓ EPC E2003412DC030119513911FF ✓ ACC PWD 1111111 ✓ KILL PWD 00000000 ✓ TID-UID E2003412 Offset=0, Word=2	Image: Constraint of the second sec
USER FFFF00000 Offset=0, Word=32	©
Access Password 00000000	Access Password 00000000 Hide
Read done!!!	Read Read done!!!

If the memory bank is locked, input the access password in "Access Password" field to read the tag data.

6. **Write the tag**: Click on the "3.Write Tag" tab on the top to write data on the selected tag memory banks.

1.Select Tag 2.F	Read Tag 3.Write Tag Exit			
PC	<u>3400</u>	3		
EPC	E2003412DC030119513911FF	С,		
ACC PWD	<u>11111111</u>	С,		
KILL PWD	0000000	С,		
USER 📃	Offset=0, Word=32	С,		
FFFF000000000	<u>0002222222200000000000000000000000000</u>	~		
Access Password	0000000			
Write				

7. Tick the checkbox(es) of the memory bank(s) you want to write. Input the new data of that field(s) and then click the "Write" button to write the new data.

1.Select Tag 2.Read	Tag 3.Write Tag Exit
PC <u>3400</u>	
	3412DC0301195139AAAA
ACC PWD 1111	<u>1111</u> 🔧
KILL PWD	0000
USER Offse	et=0, Word=1 🔧
1111	<u>~</u>
	<u> </u>
Access Password	0000000
Write	

If the memory bank is locked, input the access password in "Access Password" field to write the tag.

8. Exit Read/Write: To exit this Read / Write function, click the "Exit" tab.



6.7 Write Any



This page demonstrates how to write multiple tags EPC ID with automatic increment.

For example, you would like to write 100 tags with EPC ID starting from ABCD01234567890123456701. The parameters should be as follows:

Num of Tag = 100

Initial Value (decimal) = 1

Mask = ABCD012345678901234567XX (because it needs 2 Hex digits for total 100 numbers)

Then, you should input as below and click the "Start" button to start writing.

Write EF	2 auto increment
num of Tags	1
Initial Value(decimal	0
Input Mask	
Output Mask	ABCD012345678901234567
Fix Q Value	0
Process Retry 0	★ Toggle A/B
Write Retry 2	🔿 💿 Match Mask
	Non Match Mask
Successful Written Tag	0
Start	Stop Exit

141.1.

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6.8 Geiger Counter Search

This page demonstrates the Geiger counter tag search mode. Search or Input the EPC ID of the tag (or partial of the EPC ID) you want to search and then click the "Start" button.

GeigerSearc	hFrom	10.00	
0	50	100	
Star	RSSI V Tone Thr	eshold 75	TagSearchForm INDEX PC EPC
TagSearchFo	rm		
INDEX	PC FPC		
1	000 9999999999999999	999990053	
2	320810010000100	112345678	
3	3000 0000000000000000000000000000000000	000000000	
4 :	100000000000000000000000000000000000000	00000073	
5	B000 E28068100000039	0852358C	
6 ;	3000 345600000000000	00000000	
7 :	22226666666666666	655555555	
8	1234000000000000000000000000000000000000	0000007A	GeigerSearchFrom
9	1234000000000000000000000000000000000000	00000075	
Stop	Select 12 Ta		0 50 100 320810010000100112345678 ✓ Averaging RSSI ✓ Tone Threshold 75 Start Select Exit

When the tag is seen, it shows the RSSI value.

GeigerSearchF	rom	
0	50	100
	The second se	
32081001	000010011234567	8
🗸 Averaging F	ISSI 🔽 Tone T	hreshold 75
ar nexessar		ceccaration cont
	50	Select
Stop	55	Exit
		LAIL

6.9 Tag Security

This page demonstrates the tag security operations (lock, unlock and kill)

Click "Please Click Here To Select A Tag" to scan for the tag.

TagSecuri	ityForm
Pleas	e Click Here To Select A Tag
Kill Pwd	UNCHANGED 💌
Acc Pwd	UNCHANGED 🗸
EPC	UNCHANGED 🗸
TID	UNCHANGED 🗸
USER	UNCHANGED 🗸
Access pass	word 00000000
Apply S	ecurity User Perm-lock Exit

TagSear	TagSearchForm		
INDEX	PC	EPC	>
1	3000	AD431000000000000000000000	
2	3000	AD8A20004556D78D1A000085	
3	3000	AD431666000000000000013	
4	3000	AD7712001CF3557B23000050	
5	3000	AD7712001CF35F7519000051	
6	3400	E2003412DC030119513911FF	
7	3000	AD431666000000000000000	
8	3000	AD7712001CF3697920000052	
9	3000	AD7712001CF383761E000054	\sim
Stop		elect 26 Tags Exit	

Highlight and select the tag you want to access in the list.

After the tag is selected, select the security you want to apply on each memory bank. For Kill Password (Kill Pwd) and Access Password (Acc Pwd) banks:

- UNLOCK: Unlock the bank allow user to read and write it without access password
- PERM_UNLOCK: Permanently unlock the bank allow user to read and write it forever without access password (cannot lock it again)
- LOCK: Lock the bank cannot read and write the tag, need access password to unlock it
- PERM_LOCK: Permanently lock the bank cannot read and write the tag forever (cannot unlock it again)
- UNCHANGED: Keep the existing security state

For EPC and User Memory (USER) banks:

- UNLOCK: Unlock the bank allow user to write it without access password
- PERM_UNLOCK: Permanently unlock the bank allow user to write it forever without access password (cannot lock it again)
- LOCK: Lock the bank cannot write the tag, need access password to unlock it
- PERM_LOCK: Permanently lock the bank cannot write the tag forever (cannot unlock it again)
- UNCHANGED: Keep the existing security state

After the security state is selected, enter the access password in "Access Password" field. If the access password field of the tag is "00000000", that means no password is set on the tag and it could not be locked. Please write the access password on the tag in "Read/Write" function first.

ĺ	TagSecuri	tyForm
	<u>E20</u>	03412DC030119513911FF
	Kill Pwd	UNCHANGED
	Acc Pwd	UNCHANGED
	EPC	
	TID	UNCHANGED 🗸
	USER	UNCHANGED 🗸
	Access pass	word 11111111
	Apply S	ecurity User Perm-lock Exit

Click the "Apply Security" button to set the security on the tag's memory bank(s).

6.10 User Perm-lock

TagSecuri	ityForm	
Pleas	e Click Here To Sele	ct A Tag
Kill Pwd	UNCHANGED	~
Acc Pwd	UNCHANGED	~
EPC	UNCHANGED	*
TID	UNCHANGED	~
USER	UNCHANGED	~
Access pass	word 00000000	
Apply S	ecurity User Perm-loo	

In Tag Security, the "User Perm-lock" function is used for block-level (64 bits) Perma-lock of tag's user memory. This function is only applicable for new tag that complies to the EPC Class 1 Gen 2 Tag Specification v1.2 (e.g. Alien Higgs3). Moreover, this function is <u>only support</u> on **CS468 with firmware version 1.3.68 or above**.

To perma-lock the 64-bits block of user memory:

- 1) Click "User Perm-lock" button to enter the block perm-lock page.
- 2) Click "Please click here to select a tag" to scan and select the tag you want to lock

TagBlockPermaLockForm		
Please click here t	o select a	<u>tag</u>
512 bit User memory	Block	Locked
Permalock, with 64 bit		
DIOCK-SIZE		
Access Password		
00000000		
Read		
Lock Exit		

3) Enter the correct Access Password of the tag

TagBlockPermaLockForm		
E2003412DC0301	1951391	<u>1FF</u>
512 bit User memory Permalock, with 64 bit block-size	Block	Locked
Access Password		
1111111		
Read		
Lock Exit		.:

4) Click "Read" button to read the status of each block (64 bits) of the user memory

TagBlockPermaLockForm		
E2003412DC0301	1951391	<u>1FF</u>
512 bit User memory	Block	Locked
Permalock, with 64 bit	0	Locked
block-size	1	Unlocked
	2	Unlocked
Access Password	3	Unlocked
Accessi assivoid	4	Locked
1111111	5	Unlocked
	5	Unlocked
	1	Locked
(Read)		
Lock Exit		

5) In order to change the lock status of a block, "Right-click" the block(s) you want to lock for changing the lock status and then select "PermaLock".

TagBlockPermaLockForm		
E2003412DC030	11951391	<u>.1FF</u>
512 bit User memory	Block	Locked
Permalock, with 64 bit	0	Locked
block-size	1	Locked
	2	Unlocked
Access Presword	3	Unlocked
Access Fassword	4	Locked
11111111	5	Unlocked
	6	Unlocked
	1	Locked
Read		
Lock Exit		

- 6) Make sure the correct Access Password is entered and then click "Lock" button to perma-lock the block(s)
- 7) The blocks permalock status will be changed. Note that it is "Permanent Lock" on the block(s), it cannot be unlock again.

6.11 Kill

This page demonstrates the Kill Tag operation.

Click "Click here to select a tag to destroy" to scan and select the tag

TagKillForm	
Click here to select a tag to destro	
Warning :	
Tag will be destoryed permanently.	
Kill password : 00000000	
ExtCommand Tag Kill 🗸	
Kill Tag	Exit

After the tag is selected, enter the kill password of the tag as below. If the kill password of the tag is set as "00000000", that means no password is set on the tag and it could not be killed. Please write the password on the tag in "Read/Write" function first.



After that, click the "Kill Tag" button to kill the tag.

6.12 Setup

Please refer to Section 7 "Reader Configuration" about Reader Setup in detail.

6.13 Middleware Connectivity

The CS468 is connected to many middleware, and the list of compatibility will continuously keep growing. Currently there are 2 middleware already connected:

- 1. Sybase iAnywhere
- 2. Microsoft Biztalk

7 Reader Configuration

7.1 Reader Configuration Overview

The diagram below shows the configuration components of CSL RFID reader CS203/CS468/CS469.



7.2 IP configuration (C# and Java Demo App)

After a CSL RFID reader is found, you can configure the target device IP address (DHCP or static

IP), Device Name and TCP timeout in "Assignment" using both C# and Java Demo App.

C 8203-2 RFID READER	192 168 26 239
Image V2.18.30	00 05 7B 77 07 67
CS468-4 RFID READER	192.168.25.225
Image V2.18.32	00:05:7B 82:02:85
CS5113 RTLS Master Anchor	192,168,25,240
Firmware application V1.116.21	00.08.3C 05.5F 85
CSL RTLS Net Finder Server (CSL	R TLIS2/2833262030
HP03 (Microsoft Windows NT 5.1.26	00 Sebvite: 49x06369.0B
Firmware application V1.116.21	00.08.3C 05:5F 85
CSL RTLS Net Finder Server (CSL	R TLI9:22:032 \$2030
HP03 (Microsoft Windows NT 5.1.26	00 Set/r/de:4PadB369.08
Firmware application V1.116.21	00.08.3C 05.5F 85
CSL RTLS Net Finder Server (CSL	R TUS://2833/22030
HP03 (Microsoft Windows NT 5.1.26	00 Sebvide 49x08069.08
Press "Connect" or "A	ssignment" or other buttons:

CS203-2 RFID READER	IP Address: 192.168.25.239
Image V2.18-30	MAC Address: 00-05-78-77-07-87
CS468-4 RFID READER	IP Address: 192.168.25.225
Image V2.10,32	MAC Address: 00-05-78-82-02-85
CSL RTLS Net Finder Server (CS	IP Address: 192,168,25,130
HP03 (Microsoft Windows NT 51:2600 Service Pac	Mac address: 00-14-48-38-68-08
CS5113 RTLS Master Anchor	IP Address: 192.168.25.240
Firmware application V1.1.15.21	MAC Address: 00-08-3C-05-5F-85
	nt" or other buttons.
Press "Connect" or "Assignment	Image Bootloader Clear

C# Demo App

Java Demo App

If you want the reader to get an IP address assigned from DHCP server, tick the "DHCP Enable"

checkbox, input the DHCP retry value and click the "Assign" button.

S Assignmen	ıt					-	
Device Na	me c	6468	-4 RFID	RE/	DER		
CS203 IP	192		168		25	•	225
Subnet	255		255		255		255
Gateway	255		255	4	255	-	255
TrustedIP	0		0		0		0
DHCP Re	etry	0	Assign] T] D	rusteo HCP	l Ei En	nable able

Device Name	CS468	3-41	RFID RI	EAC	ER	
Reader IP	192		168		25	225
Subnet	255		255		255	255
ateway	255		255	Vie	255	255

Java Demo App

C# Demo App

C# Demo App also provides a "**Trusted Server**" feature that only a specific device can connect to the CSL RFID reader. To enable this feature, tick the "**Trusted Enable**" checkbox and input the IP address of the computer/device in "**TrustedIP**" boxes, and then click "**Assign**" button. Then, only the computer with the IP address in the "**TrustedIP**" box is allowed to connect with this reader.

7.3 Reconnect Timeout (C# Demo App)

After a CSL RFID lost connection, CSL Demo App can reconnect to the RFID Reader within a time. In *Java Demo App*, the default Reconnect timeout is 5 seconds.

In C# Demo App, to setup the timeout for reconnection, press "Setup" button in the Main Menu.



C# Demo App

In the window "Setup", choose "General Options". In the field "Reconnect Timeout" user can

set the Reconnect timeout in ms (default value is 30000, which is equal to 30 seconds).



C# Demo App

Click "Apply" when the setting is confirmed.

7.4 Interface to Reader (C# Demo App)

User can connect to CSL RFID Reader (CS203 / CS468 / CS469) via Ethernet interface. It is the default interface. For some CSL RFID Reader, USB and Serial (RS232) interfaces also available. User should refer to the specification of CSL RFID Reader and check "**Connectivity**" before changing the reader interface setting using the Demo App.

User can use C# Demo App to change the reader interface setting. Press "**Set Interfac**" button in the Main Menu.



C# Demo App

User can set the reader interface setting with option Ethernet / USB / Serial provided as follow.

Press "**OK**" to confirm.



C# Demo App

7.5 Antenna Port and Sequence (C# and Java Demo App)

<u>Antenna Port</u>

User can set the antenna ports of CSL RFID Reader into Active / Inactive state using both C# and Java Demo App.

User should check the number of antenna ports available in the CSL RFID Reader according to the specification. Below is example of CS203, CS468 and CS469:

Number of antenna ports available in CS203:	1	=> Max 1 active port 0
Number of antenna ports available in CS468:	16	=> Max 16 active ports 0 - 15
Number of antenna ports available in CS469:	4	=> Max 3 active ports 0 - 3

To set the ACTIVE / INACTIVE state of CSL RFID Reader antenna ports, user press "**Setup**" in the Demo App.







C# Demo App

If user is using C# Demo App, click on "Antenna Port Config".

If user is using Java Demo App, click on the tab "Antenna Ports".

Setup	Setup
Gerenal Options Inventory Config Carrier Wave DynamicQ Profile 2 Detail Country AU Antenna Port Config Frequencies(MHz) Fixed Channel 920.75 Enable LBT Tx On Time (ms) 400 Enable Freq Agile	General Options Custom Inventory DynamicQ Antenna Sequence Antenna Ports Profile 2 Enable L81 Fixed Channel Country AU Frequencies (MHz) Eco.75 RSSI filter 0
Reconnec 30000 Timeout Operation Config	Appiy

C# Demo App

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User can enable the antenna ports by clicking on buttons from "Inactive" to "Active" state.

User can disable the antenna ports by setting buttons from "Active" to "Inactive" state.

	#	Power Level 1/10 dBm	Dwell Time (miliseconds)	Inventory Rounds	Antenna Sense Threshold (Ohms)	Antenna Sense Value (Ohms)	1000
Active	0	300	2000	No Limit	1048575	٥	
Active	1	300	2000	No Limit	1048575	0	
Active	2	300	2000	No Limit	1048575	۵	
Active	3	300	2000	No Limit	1048575	0	
Active	4	300	2000	No Limit	1048575	0	
nactive	5						

C# Demo App

General Option	is Cu	stom inventory	Dynamics	Q Antenna	Sequence	Antenna Ports					
	#	Power (dBm/10)	Dwell (ms)	Inventory Rounds	Enable Local Inventory	Inventory Algorithm	StartQ	Enable Local Profile	Profile	Enable Local Channel	Channel
Active	0	300	2000	65535	100	OynamicQ	7		2		
Active	1	300	2000	65535		DynamicQ	7		2		
Active	2	300	2000	65535		DynamicQ	7	-	2		1
Active	3	300	2000	65535		DynamicQ	7		2		
Active	4	300	2000	65535	100	DynamicQ	7		2		
Active	5	300	2000	65535		DynamicQ	7		2		
Inactive	8	300	2000	65535		DynamicO	7		2		_
Inactive	7	300	2000	65535	100	DynamicQ	7		2		

Java Demo App

Click "**Apply**" when the setting is confirmed. With this setting, each antenna port can have a different output power. However all the Active ports are of the same inventory properties and profile properties and frequency channel properties.

You can also set each port to have a different inventory and profile property and frequency property by ticking the box "Enable Local Inventory" and "Enable Local Profile" and "Enable Local Channel" and then selecting the values you like. The following is an example for a European version, where there are 4 frequency channels and the user can select a different frequency. The Start Q values are also different. This is particularly meaningful because the antenna may be inventorying different number of tags in their operation direction. Of course, for different Q value, one has to be careful as to set the appropriate **Dwell time (The duration time of each antenna port in ms)**. If an antenna is reading a lot of tags, the Dwell time needs to be increased as well.

	#	a Iue I	Enable Local Inventory	Inventory Algorithm		StartQ	Enable Local LinkProfile	Profile	Enable Local Frequency	Frequency
Active	0		7	DYNAMI	•	3	V	2	V	1
Active	1			DYNAMI		7	2	4	V	2
Active	2		1	DYNAMI		2	V	2	V	3
hactive	3			DYNAMI	-					
nactive	4			DYNAMI	Ψ.		E1			
active	5		1	DYNAMI	•		1			

C# Demo App

General Optio	ns Ci	istom Inventory	Dynamic	Q Antenna	a Sequence	Antenna Ports					
	#	Power (dBm/10)	Dwell (ms)	Inventory Rounds	Enable Local Inventory	Algorithm	StartQ	Enable Local Profile	Profile	Enable Local Channel	Channel
Active	0	300	2000	65535	K	DynamicQ	3	K	2	r	1
Active	1	300	2000	65535	V	DynamicQ	7	V	4	V	2
Active	2	300	2000	65535	Ľ	DynamicQ	2	V	2	V	3
Inactive	3	0	2000	65535		DynamicQ	7		2		0
Inactive	4	300	2000	65535		DynamicQ	7		2		0
Inactive	5	300	2000	65535		DynamicQ	7		2		0
Inactive	6	300	2000	65535		DynamicQ	7		2		0
Inactive	7	300	2000	65535		DynamicQ	7		2		0
Inactive	7	300	2000	65535		DynamicQ	7		2		

Java Demo App

Antenna Sequence

In "Antenna Sequence" tab, the antenna switching sequence can be configured. This is needed in certain applications where the connected antenna from Port 0 to Port 15 may not be excited in that simple ascending order, but rather in some weird order pertaining to actual physical setup.

1. Normal Mode – The antenna port switching follows the normal port number sequence (e.g., 0,

1, 2, 3, 4, 5, 6,14,15 and then repeat from 0 again)

2. Sequence Mode - User-defined antenna port switching sequence (e.g. one can define 0, 15,

1, 14, 2, 13, 3,7,8 and then repeat)

- SmartCheck Mode Reader detects if there is any tag on each antenna. If there is no tag detected, the reader will switch to next antenna port immediately.
- 4. Sequence and SmartCheck Mode Combination of Sequence mode and SmartCheck mode.

User can configure antenna switching sequence when the option "Sequence" or "Sequence and

Smart Check" mode is chosen.

Setup	And store and the			-		Sec.	×
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports			
Mode	Sequence	-					
0	Normal						
Sequence Size	Sequence	1					
Index	Smart Check						
	Sequence and Smart	Check					
- W.		10			 		
							ADDIV

Java Demo App Copyright © Convergence Systems Limited, All Rights Reserved

Enter the "Sequence Size", which is the number of antenna sequence in each cycle. Please note

that the Sequence Size is equal to the number of active antenna port configured by user.

ietup	and the second se			-		-	
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports			
Mode	Sequence	-					
Sequence Size	6 1-48	•					
Index	Antenna Port (0-1	5)					
	1	3 *					
2	3	2 =					
		4					
							_
							Apply
	_	_			 -		_

Java Demo App

In the antenna sequence table, input the antenna port switching sequence in the column

"Antenna Port (0-15)" according to the available active antenna port index.

Click the "Apply" button to confirm.

ietup 👘					
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports	
Mode	Sequence	•			
Sequence Size	6 1-48				
Index	Antenna Port (0-1	5)			
1		3 ▲			
2		2			
4		1			
					Apply
-	-	-			

Java Demo App

Click "Apply" when the setting is confirmed.

1.0.23

2.0.20

1520

Hopping

2

300

7.6 Power Level (C# and Java Demo App)

User can set the power of CSL RFID Reader up to maximum 30 dBm using both C# and Java

Demo App.

To set up power level of the CSL RFID Reader, press "Setup" button in the Main Menu.



C# Demo App

If user is using C# Demo App, click on "Antenna Port Config"

If user is using Java Demo App, click on the tab "Antenna Ports"

Setup	Setup	×
Gerenal Options Inventory Config Carrier Wave DynamicQ Profile 2 Detail Country AU Antenna Port Config Frequencies(MHz)	General Options Custom Inventory DynamicQ Antenna Sequence Antenna Ports Profile 2	
920.75 Enable LBT Tx On Time (ms) 400 Enable Freq Agile	Frequencies (NHz) 20.75 V Save Settings	
Reconnec 30000		Apply
Status Apply		

C# Demo App

Java Demo App

If user is using C# Demo App, user can change the power level by changing the value in the field

"Power Level 1/10 dBm". Press "Apply Change" button to confirm.

	#	Power Level 1/10 dBm	Dwel Time (miliseconds)	Inventory Rounds	Antenna Sense Threshold (Ohms)	Antenna Sensa Value (Ohms)	-
Active	0	300	2000	No Limit	1048575	0	
inactive	1						
Inactive	2						Ĩ
Inactive	3						
Inactive	4						
Inactive	5						1

C# Demo App

If user is using Java Demo App, user can change the power level by changing the value in the

IICIU FUWEI (UDIII/IU). FIESS ADDIV DULLUI LU CUIIIIII	field '	"Power	(dBm/10)".	. Press	"Apply"	button to	o confirm
--	---------	--------	------------	---------	---------	-----------	-----------

General Option	ns Cu	stom Inventory	Dynamic	Antenna	I Sequence	Antenna Ports					
	#	Power (dBm/10)	Dwell (ms)	Inventory Rounds	Enable Local Inventory	Inventory Algorithm	StartO	Enable Local Profile	Profile	Enable Local Channel	Channel
Active	0	300	2000	65535		DynamicQ	7		2		1
Inactive	1	300	2000	65535		DynamicQ	7		2		(
inactive	2	300	2000	65535		DynamicQ	7		2		1
Inactive	з	300	2000	65535		DynamicQ	7		2		1
Inactive	4	300	2000	65535		DynamicQ	7		2		1
Inactive	5	300	2000	65535		DynamicQ	7		2		1
Inactive	б	300	2000	55535		DynamicQ	7		2		1
Inactive	7	300	2000	65535		DynamicQ	7		2		8
					(land)	1 0)					

Java Demo App

Please note that Antenna port output power is set in 0.1dBm. The default value is 300, which is

equal to 30dBm.

7.7 Country, Frequency and Fixed Channel (C# and Java Demo App)

CSL RFID Reader can be used in different region and countries worldwide based on EPCglobal

Country / Region	Frequency	Certification
USA	902MHz ~ 928MHz	(FCC)
Europe	865MHz ~ 868MHz	(CE)
China	920MHz ~ 925MHz	(SRRC)
Japan	915MHz ~ 922MHz	(TELEC)
Australia	920MHz ~ 926MHz	(C-TICK)
India	865MHz ~ 867MHz	-
South Africa	915MHz ~ 919MHz	(ICASA)
	865MHz ~ 868MHz	
Taiwan	922MHz ~ 928MHz	(NCC)
Hong Kong	920MHz ~ 925MHz	(OFTA)
Malaysia	919MHz ~ 923MHz	(SIRIM)
Singapore	920MHz ~ 925MHz	(FCC)

"Regulatory	v status fo	r usina	RFID in th	snectrum"
Regulatory	y status iu	using		Spectrum

Please refer to the document "Regulatory status for using RFID in the UHF spectrum" and the

Order Code of CSL RFID Reader to set the Country, Frequency and Fixed Channel.

The Order Code is printed at the rear panel of the CSL RFID Reader.

The format of Order Code is shown as follow:

- CS203: CS203ETHER-NXHCP
- CS468: CS469-N
- CS469: CS468-N

where N:

N=1: 865-868 MHz (Europe) & 865-867 MHz (India) N=2: 902-928 MHz (USA) N=4: 922-928 MHz (Taiwan) N=7: 920-925 MHz (China, Australia, Malaysia, Hong Kong etc) N=8: 915-922 MHz (Japan)



User can set the Country, Frequency and Fixed Channel of CSL RFID Reader using both C# and Java Demo App.



To set up power level of the CSL RFID Reader, press "Setup" button in the Main Menu.

If user is using C# Demo App, click on "General Options".

If user is using Java Demo App, click on the tab "General Options".

Setup	Setup
Gerenal Options Inventory Config Carrier Wave DynamicQ Profile 2 Detail Antenna Port Config Frequencies (MHz) Frequencies (MHz) S20.75 Enable LBT Tx On Time (ms) 400 Enable Freq Agile 	General Options Custom Inventory DynamicQ Antenna Sequence Antenna Ports Profile 2 Enable L8T Fixed Channel Country AU Enable Frequency Agile Frequencies (MHz) 220.75 Save Settings R SSI filter 0
Reconnec 30000 🔄 🗹 Save settings <u>Operation Config</u> Status Apply	Аррин — — — — — — — — — — — — — — — — — — —

C# Demo App

Java Demo App

If user is using C# Demo App, choose the country / region in the field "Country".



C# Demo App

Gerenal Optio	ns	Inve	ntory C	onfig	Carrier Wa	ve D)ynamicG
Profile	2			۲	<u>Detail</u>	A. 174	a ya
Country	CN	1		-	Antenna	Port C	ontig
Frequencie	es(M	Hz)			Fixed	d Cha	nnel
	92	0.625		×	Enab	le LB	r.
Tx On Tim	e (m	s)	400		Enab	le Fre	iq Agile
Reconnec t Timeout	300	000			🔽 Save	settir	igs
Operation (Conf	iq					

C# Demo App

Country/Region option for CSL RFID readers:

United state	: FCC
Europe	: ESTI
India	: IN
G800	: G800
Australia	: AU
Brazil 1	: BR1
Brazil 2	: BR2
Hong Kong	: HK
Thailand	: TH
Singapore	: SG
Malaysia	: MY
South Africa	: ZA
Indonesia	: ID
China	: CN / CN1 / CN2 / CN3 / CN4 / CN5 / CN6 / CN7 / CN8 / CN9 / CN10 / CN11 /
CN12	
Taiwan	: TW
Japan	: JP

Below are available options for reader with different order code N

- N = 1 : ETSI / IN / G800
- N = 2 : FCC / AU / BR1 / BR2 / HK / TW / TH / SG / MY / ZA / ID
- N = 4 : AU / MY / SG / TW / ID / CN / CN1 / CN2 / CN3 / CN4 / CN5 / CN6 / CN7 / CN8 / CN9 / CN10 / CN11 / CN12
- N = 7 : AU / TH / SG / CN / CN1 / CN2 / CN3 / CN4 / CN5 / CN6 / CN7 / CN8 / CN9 / CN10 / CN11 / CN12
- N = 8 : JP

If user wants to operate the RFID Reader in one frequency channel without frequency hopping,

tick the checkbox "Fixed Channel" and select the frequency in the field "Frequencies(MHz)".



C# Demo App



C# Demo App

Click "Apply" when the setting is confirmed.

The updated configuration can be checked in the Main Menu of Demo App.



C# Demo App

If user is using Java Demo App, choose the country / region in the field "Country" in the tab

"General Options".

Setup						x
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports		
Profile	2 💌	Enable	LBT			
		Fixed C	hannel			
Country	AU 💌	Enable	Frequency Agile			
Frequencies (MHz)	AU	🖌 Save Se	ettings			
RSSI filter	CN =					
	CN1 —					
	CN2					
	CN3					_
	CN4				.Appl	Ŋ.
	CN5 👻					

Java Demo App

Setup						x
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports		
Profile	2 🗸	Enable	LBT hannel			
Country	HK 💌	Enable I	Frequency Agile			
Frequencies (MHz)	920.75 👻	N Save Se	ettings			
RSSI filter	0					
					Арр	oly

Java Demo App

If user wants to operate the RFID Reader in one frequency channel without frequency hopping,

tick the checkbox "Fixed Channel".

Setup					100	19 Mar 1	×
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports			
Profile	2	Enable	LBT				
Country	HK 💌	Enable	Frequency Agile				
Frequencies (MHz)	920.75 👻	Save Se	ettings				
RSSI filter	0						
						Aj	pply

Java Demo App

Click "Apply" and wait until the Main Menu appears.

Enter the window form again by pressing "Setup" button in the Main Menu and clicking on the tab

"General Options".

Select the frequency in the field "Frequencies (MHz)".

etup		-			×
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports	
Profile	2	Enable	LBT		
		Fixed C	hannel		
Country	НК 💌	🔲 Enable	Frequency Agile		
in a contraction		Save Se	ettings		
Frequencies (MHz	920.75 🔻	- Annual			
RSSI filter	920.75				
	921.25				
	921.75				
	922.25				
	922.75				Apply
	923.25				24PP-1
	923.75				
	924.25				

Java Demo App

Click "Apply" when the setting is confirmed.

The updated configuration can be checked in the Main Menu of Demo App.

Inventory	Demo App Ver : JCSLibrary Ver : RFID Lib Ver : Firmware Ver :		1.0.23 2.0.26 2.0.20 1.5.20	
Inventory Read				
Read W/rite				
Tredd White	Frequency P	Profile :	HK	
Geiger	Fixed Frequency :		922.25 N	Hz
Security	Profile : Power :		2 300	
Kill	Selected device			
Setup	Device ID:	REA4135	E \$0002	•
G2iX				
Monza4				

Java Demo App
7.8 RSSI Filter (C# and Java Demo App)

The RSSI (Received Signal Strength Indicator) value is an indicator of signal strength from an RFID tag to an RFID reader.

Normally RSSI can be used in

- Estimating the distance between an RFID tag and an RFID reader. The higher the RSSI value, the closer the RFID tag is to the reader. (The environment is analyzed and taken into consideration.)
- Identifying the movement direction of an RFID tag. (As the RFID tag moves closer to the RFID reader, the RSSI value increases. When the RFID tag moves away from the RFID reader, the signal gets weaker)
- Setting optimal reading and writing conditions. (RSSI value can be used to analyze the tag reading and writing conditions. The optimal condition is to be able to use as little power as possible for achieving a strong enough signal to perform the RFID actions)
- Analyzing and optimizing the environment.
- Locating lost tags. (Geiger search: Many retail and supply chain operations require a "locate tag" application. The RSSI value can be used for guiding the user closer and closer to the target)

By applying RSSI filters only tags within a certain distance are registered. RFID reading and writing conditions can be optimized for specific applications.

To obtain the threshold value, user can use Geiger to get the RSSI value range of using a tag located at a distance from the CSL RFID reader.

If user is using C# Demo App, press "Geiger" in the Main Menu.



Place the tag in front of reader antenna (Port 0) for distance estimation.

In the GeigerSearchForm, press "Geiger", user can check the range of RSSI value.

GeigerSearchFrom			GeigerSearchFrom		
0 50	100		0	50	100
			-		
V Averaging RSSI V Tor	e Threshold 75		V Averaging RSSI	☑ Tone	Threshold 75
Geiger	Select Exit		Stop	64	Select Exit
C# Demo App		- 1	C# Demo App	0	

Inventory	PC Side Version:	
PoodWrite	C# Native 3.0	
Reauville	Demo App Vers	3.1.37
WriteAny	CSLib Vers	3.0.20
Geiger	Reader Side Version:	
Security	RFID Firmware Vers	1.5.20
	Network ProcBootLoader	2.9.03
Kill	Network Proc 8051 App	2.18.32
C\$9010	Frequency Profile : AU	
ColdChain	Frequency : Hopping	
Concentant	Profile : 2	
Monza4QT	Power: 300	
G2iL/M	Device Type : CS468	
G2iL Func		
Set Interfac		
Temp Mon		
InvGPIOSyn		
InvGPIOAsyn		
Setup		
Exit		GENCE

Go to the Main Menu. Press "Setup" in the Main Menu.

Click on "Inventory Config", tick the checkbox "Enable" and set the RSSI threshold value in the

field "RSSI filter". The filter will ignore tags with RSSI value less than the threshold set.

a court				Contraction in the second		1	102
Gerenal Options	Inventory Config	Carrier Wave	DynamicQ	Gerenal Options	Inventory Config	Carrier Wave	DynamicQ
Operation	Continuous	Blocking r	node	Operation	Continuous	Blocking	mode
Selected	ALL			Selected	ALL		
Session	S0	•		Session	SO		
Target	A	*		Target	A		
Algorithm	DYNAMICQ			Algorithm	DYNAMICQ	-	
RSSI Filter	Enable 60)		RSSI Filter	☑ Enable 6	io 🚖	
			VA	Charterin		ſ	Arrely

C# Demo App

C# Demo App

Click "Apply" to confirm the setting.

If user is using Java Demo App, press "Geiger" in the Main Menu.

Inventory	Demo App Ver	1.0.23
Inventory Read	JCSLibrary Ver :	2.0.26
	RFID LID Ver :	2.0.20
Read Write	Firmware Ver :	1.5.20
Geiger	requency Profile	Hopping
Security	Profile :	2
Kill	Selected device	000
Setup	Device ID: REA41	35E \$0002 💌
G2iX		
Monzad		

Java Demo App

Place the tag in front of reader antenna (Port 0) for distance estimation.

Click "Search" and wait until the tag for distance is found. Select the tag and click "Geiger" tab.

Geiger Search	Geiger Search	X
Select Tag Geiger	Select Tag Geiger 2	
Selected Port 0	Selected Port 0+	
PC EPC	PC EPC	
	3000 320833b2ddd9014012345678	
	3400 990933b2ddd901400000002	
	1	
Search Select or Enter EPC ID	Stop Clear 990933b2ddd901400000002	

Java Demo

Java Demo App

In "Geiger" tab, click "Geiger" and check the range of RSSI value.

eiger Search			Geiger Search		×
Select Tag Ge	iger		Select Tag	Seiger	
EPC S	90933b2ddd901400000	0002	EPC	990933b2ddd90140	0000002
0	50	100	O	50	100
☑ Averaging Geiger	g RSSI I Tone T	Threshold 75	Averagi	ng RSSI 🗹 Tone	Threshold 75

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_ — × G Inventory Demo App Ver : 1.0.23 JCSLibrary Ver : 2.0.26 Inventory Read RFID LIb Ver : 2.0.20 1520 Firmware Ver Read Write Frequency Profile : AU Geiger Frequency: Hopping Profile 2 Security Power: 300 Selected device Device ID: REA4135E \$0002 💌 Setup G2iX Monza4

Go to the Main Menu. Press "Setup" in the Main Menu.

Java Demo App

In "General Options", set the RSSI threshold value in the field "RSSI filter".

The filter will ignore tags with RSSI value less than the threshold set.

Setup		transfer inclusion and	×
General Options	Custom Inventory	DynamicQ Antenna Sequence Antenna Ports	
Profile	2	Enable LBT Fixed Channel	
Country	нк 💌	Enable Frequency Agile	
Frequencies (MHz)	920.75 🗢	✓ Save Settings	
RSSI filter	60		
			Apply

Java Demo App

Click "Apply" to confirm the setting.

7.9 Link Profile (C# and Java Demo App)

Different modulation profile of RFID reader (Interrogator) and the Tag can be selected by the user for different situation.

User should refer to the document EPC Radio-Frequency Identity Protocols Class-1

Generation-2 UHF RFID Protocol for Communications at 860 MHz – 960 MHz by EPCglobal when setting Link Profile.

The default setting is profile 2. It is also the recommended setting for most of the common applications. In CS468-3 (Japan) and CS468-1 (ETSI) readers, only profiles 0, 2, 3 and 5 are selectable. (Profile 0 is also not advised for CS468-3 Japanese reader).

Profile	0	1	2	3	4	5
R-T Modulation	DSB-ASK	DSB-ASK	PR-ASK	PR-ASK	DSB-ASK	DSB-ASK
Tari (µs)	25.00	12.5	25.00	25.00	6.25	25.00
R-T speed (kbps)	40	80	40	40	160	40
PIE	2 : 1	2 : 1	1.5 : 1	1.5 : 1	1.5 : 1	1.5 : 1
Pulse Width (uS)	12.50	6.25	12.50	12.50	3.13	12.50
T-R LF (kbps)	40	160	250	300	400	250
T-R Modulation	FM0	Miller-2	Miller-4	Miller-4	FM0	Miller-2
Divide Ratio	8	8	64 / 3	64 / 3	8	64 / 3
T-R Data Rate	40	80	62.5	75	400	125
(kbps)						

DSB-ASK Double-sideband amplitude shift-keying

PR-ASK Phase-reversal amplitude shift keying

R-T Modulation Interrogator-to-Tag modulation

T-R Modulation Tag-to-Interrogator modulation

Tari

Reference time interval for a data-0 in Interrogator-to-Tag signaling. The mnemonic "Tari" devices from the ISO/IEC 18000-6 (part A) specification, in which Tari is an abbreviation for Type A Reference Interval. User can set the Link Profile of CSL RFID Reader using both C# and Java Demo App.

To set up power level of the CSL RFID Reader, press "Setup" button in the Main Menu.



C# Demo App

If user is using C# Demo App, click on "Antenna Port Config"

If user is using Java Demo App, click on the tab "Antenna Ports"





Java Demo App

If user is using C# Demo App, user can tick the checkbox in "Enable Local LinkProfile" and change the value in the field "Profile" for INDIVIDUAL ACTIVE PORT.

Press "Apply Change" button to confirm.

	#	StatQ	Enable Local LinkProfile	Profile	Enable Local Frequency	Frequency
Active	0	0		2		0
Active	1	0		3		0
hactive	2					
hactive	3		E		E	
hactive	4		E			
hactive	5				(F)	

C# Demo App

If user is using Java Demo App, user can tick the checkbox in "**Enable Local Profile**" and change the value in the field "**Profile**" for **INDIVIDUAL ACTIVE PORT**.

Press "Apply" button to confirm.

General Options	Cus	tom Inventory	DynamicQ	Antenna	Sequence	Antenna Ports	1				10-
	#	Power (dBm/10)	Dwell (ms)	Inventory Rounds	Enable Local Inventory	Inventory Algorithm	StartQ	Enable Local Profile	Profile	Enable Local Channel	Channel
Active	0	300	2000	65535		DynamicQ	1	2	2		0
Active	1	0	2000	65535		DynamicQ		V	3		0
Inactive	2	0	2000	65535		DynamicQ	7		2		0
Inactive	3	0	2000	65535		DynamicQ	7		2		0
Inactive	4	300	2000	65535		DynamicQ	7		2		0
Inactive	5	300	2000	65535		DynamicQ	7		2	• 🛄 •	0
Inactive	6	300	2000	65535		DynamicQ	7		2		0
Inactive	7	300	2000	65535		DynamicQ	7		2		0

Java Demo App

If user wants to set the Profile for ALL ACTIVE PORTS instead of INDIVIDUAL PORT in the

reader, the field "Profile" in the Setup menu is provided. All the ports share the same setting.

(User should have those checkboxes in "Enable Local Profile" unchecked before use)

General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports	
Profile	2 🔻	Enable	LBT hannel		
Country	AU	Enable	Frequency Agile		
Frequencies (MHz) RSSI filter	920.75	E			
					Apply

7.10 Target and Toggle A / B Flag (C# and Java Demo App)

There are 2 meanings for **Target** in the standard of **EPC Radio-Frequency Identity Protocols Class-1 Generation-2 UHF RFID Protocol for Communications at 860 MHz – 960 MHz** by EPCglobal. One of them is the parameter of RFID protocol **Inventory – Select** Command, which indicates whether the Select command modifies a Tag's Selected (SL) flag or its inventoried flag.

Another **Target** is the parameter of RFID protocol **Inventory – Query** Command, which selects whether Tags whose inventoried flag is **A or B** participate in the inventor round. Tags may change their inventoried from A to B (or vice versa) as a result of being singulated.

In CSL RFID Reader Read / Write configuration, **Target** is the parameter of RFID protocol **Inventory – Query** Command. The options for Query Command in the field **Target** are "A", "B" and "Unknown". User can set the Target of CSL RFID Reader using both C# and Java Demo App.

Inventory contains a designation of the tags with which flag is to be inventoried. User can define it to be Flag A, or Flag B. There is also a parameter toggle, if user set it to "on", i.e. toggle, then in continuous inventory it will inventory Flag A in the first round, then Flag B in the next round, and so on. If user set it to "off", then it will keep on inventorying the same flag.

So the usual trick is to set inventory to read Flag A, and toggle to off. Then it will keep on reading Flag A tags. Those that have been read will become flag B and it will not respond to an inventory of Flag A tags. This will the crowded situation will improve as reader read more and more tags, leaving only those who have not been read yet (hence still in flag A state) to respond with no jamming by others.

Tag when first booted up (powered up) has Flag A. After it is inventoried, it will become Flag B for certain period of time depending on the persistence selection. Please check EPCGlobal specs in detail.

To set up **Target** of the CSL RFID Reader, press "Setup" button in the Main Menu.



Inventory	Demo App Ver :	1.0.23
Inventory Read	JCSLibrary Ver :	2.0.26
Read Write	Firmware Ver	1520
Geiger	Frequency Profile : Frequency :	AU Hopping
Security	Profile : Power :	2 300
Kill	Selected device	
Setup	Device ID: REA413	5E \$0002
G2iX		
Monza4		

C# Demo

If user is using C# Demo App, click on "Inventory Config".

If user is using Java Demo App, click on the tab "Custom Inventory".

Setup	Setup	
Gerenal Options Inventory Config Carrier Wave DynamicQ Profile 2 • Detail Country AU • Antenna Port Config Frequencies(MHz) • Fixed Channel 920.75 • Enable LBT Tx On Time (ms) 400 • Enable Freq Agile	General Options Custom Inventory DynamicQ Antenna Sequence Antenna Ports Profile 2	
Reconnec 30000 🗢 Save settings t Timeout Operation Config Status Apply		Аррну

C# Demo App

Check the field "Target" in the tab, user can choose A / B / UNKNOWN.

Setup			x	Setup	ST.	-	and the second	-	10.00	X
Gerenal Options	Inventory Config	Carrier Wave	DynamicQ	General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports		
Operation	Continuous	Blocking n	node	Operation	Continuous	Blocking mode	E			
Selected	ALL			Selected /	NLL I	-				
Session	SO			Session	50	-				
Target	R	•		Target /	1	-				
Algorithm	A B UNKNOWN			Algorithm	N.					
RSSI Filter				e e	, Inknown					
										Apply
Status			Apply	lava Dam	o					

C# Demo App

Java Demo App

Press "Apply" button to confirm.

7.11 Session and Tag Selection (C# and Java Demo App)

Session is an inventory process comprising a reader and an associated Tag population. A reader chooses one of four sessions and inventories Tags within that session. The reader and associates Tag population operate in one and only one session for the duration of an inventory round. For each session, Tags maintain a corresponding inventoried flag. Sessions allow Tags to keep track of their inventoried status separately for each of four possible time-interleaved inventory processes, using an independent inventoried flag for each process.

7.12 Slot-Count Parameter Q and Dwell Time (C# and Java Demo App)

RFID Protocol Inventory - Query Command contains a Slot-Counter Parameter Q.

When participating Tags receive a Query, they pick a pseudo-random value in the range $(0, 2^{Q}-1)$ and load this value into their slot counter. Tag which picks a zero transition to the reply state replies immediately. Tags which pick a nonzero value transition to the arbitrate state await a QueryAdjust or a QueryRep command to decrement the value in its slot counter. Tags reply when the value in their slot counter (i.e. their slot) is zero. Since Q is an integer in the range (0, 15), the corresponding Tag-response probabilities range from $2^{0} = 1$ to $2^{-15} = 0.0000305$.

It is usually recommended to set a Q-value that have the corresponding number of slots larger than the exact maximum number of Tags to be read by the reader. For example, if there are 40 tags to be read by the reader, the Q-value is configured to 6, in which $2^{Q} = 2^{6} = 64 > 40$.

7.13 Inventory Algorithm: Fix Q and Dynamic Q Algorithm (C# and Java Demo App)

In CSL RFID readers, it consists of two main inventory algorithms (Fixed Q Algorithm and Dynamic Q Algorithm). The variable Q algorithms differ in their mechanism for adjusting the Q values at the end of each round. It also provides routines for the four tag access functions (read, write, kill and lock).

Fixed Q Algorithm

This algorithm runs all inventory rounds with a single Q value. In this algorithm an inventory cycle consists of one or more rounds, each of which will attempt to read every slot. The number of slots to search is given by 2^Q. For example, a Q of 7 will cause the algorithm to search 128 slots on each round. One word of caution, if the time it takes to run the round is greater that the frequency hop time (and the session is 0) or **antenna dwell time (The duration time of each antenna port in ms)**, the round will never complete.

Dynamic Q Algorithm

In this algorithm, the value of Q is dynamically adjusted based on the periodic evaluation of the relative frequency of **RN16 (16-bit random or pseudo-random number)** timeouts versus EPC timeouts. Each round is comprised of a Query and up to MaxReps QueryReps. The value of Q for the subsequent round is determined by the results of the current round. If the number of RN16 timeouts is greater than the number of EPC timeouts multiplied by thresHi, Q is decremented (presumed empty slots outnumber presumed collisions). If the number of RN16 timeouts is less than the number of EPC time outs times thresLo, Q is incremented (presumed collisions outnumber presumed empty slots). If the number of RN16 time outs falls between those two values, Q remains unchanged.

An inventory cycle is comprised of one or more inventory rounds, and is terminated when a round is executed with Q = 0 and no tags read.

To set up power level of the CSL RFID Reader, press "Setup" button in the Main Menu.



If user is using C# Demo App, click on "Inventory Config".

If user is using Java Demo App, click on the tab "Custom Inventory".

Setup	Setup	×
Gerenal Options Inventory Config Carrier Wave DynamicQ Profile 2 Detail Country AU Aritenna Port Config Frequencies(MHz) Fixed Channel 920.75 Enable LBT Tx On Time (ms) 400 Enable Freq Agile	General Options Custom Inventory DynamicQ Antenna Sequence Antenna Ports Profile 2 Enable L8Y Fixed Channel Country AU Enable Frequency Agile Frequencies (MHz) 20.75 Sste Settlings 	
Reconnec 30000 Save settings		Apply

C# Demo App

In the field "Algorithm", choose "FIXEDQ" for Fixed Q Algorithm, "DYNAMICQ" for Dynamic Q

Algorithm.

Setup		Setup	×
Gerenal Options	Inventory Config Carrier Wave DynamicQ	General Options Custom Inventory DynamicQ Antenna Sequence Antenna Ports	
Operation	Continuous Blocking mode	Operation 📝 Continuous 🔲 Blocking mode	
Selected	ALL 👻	Selected ALL	
Session	S0 🗸	Seasion S0 💌	
Target	A 🔹	Target A	
Algorithm		Algorithm DYNAMICQ 👻	
RSSI Filter	DYNAMICQ UNKNOWN	FILEDO DYNAMICO DYNAMICO AD ULST	-
Status	Apply	DYNAMICO_THRESH UNKNOWN	

C# Demo App

C# Demo App

If "FIXEDQ" is chosen, user can go to the tab "FixedQ" and set the value of Q in the field "Q

Value".

Setup	-					×
Gerenal Options	Inventory (Config (arrier Wave	Antenna Sequence	FixedQ	
QValue	7					
Retry	0	*				
Toggle						
Repeat						
				Apply		
Status						a).

C# Demo App

Setup		Contraction of the			A DESIGN	×
General Options	Custom Inventory	FixedQ Ar	tenna Sequence	Antenna Ports		
Q Value 7	0-1	õ				
Retry 0	0-2	55				
🖌 Toggle						
🔄 Repeat						
					 	_
						Apply

If "DYNAMICQ" is chosen, user can go to the tab "DynamicQ" and set the value of Start Q in

the field "StartQValue".

Setup						×
Gerenal Options	Inventory Config	Carrier Wave	Antenna Sequence	DynamicQ		
StartQValue	7	÷				
MinQValue	0	<u>A</u>				
ThresholdMultip	plier 4	1				
Retry	0	÷.				
MaxQValue	15	÷				
Toggle						
22						
			-			
			Apply)		
Status						æ

etup	Summer of the local division of the local di				
General Options	Custom Inventory	DynamicQ	Antenna Sequence	Antenna Ports	
StartQValue	7	0-15			
MinQValue	0	0-15			
MaxQValue	15	0- <mark>1</mark> 5			
MaxQueryRep	0	0-255			
Retry	0	0-255			
V Toggle					
					Apply

7.14 Read TID, User Bank and Save Tag Data in Log File (C# Demo App)

For RFID Tag with **TID bank** available, user can use C# Demo App to read TID data.

Go to "Inventory" in Demo App. Tick the checkbox in the field "Read TID". Fill in the blanks for

offset value and number of word read from TID bank.



Click "**Run**" and check the EPC to verify the tag with TID data available, TID data can be checked in "**TID**" column.

IP = 19	2.168.25.205, Se	erial = REA4135	ES0002		-		-	-			Control
nden	PĊ	XPC_W1	XPC_W2	EPC	TID	UBER	R551	Count	Antenne Port	C3.016	O Run
	3400			555566663C0000012	E2808040		76.8	76	0	A4D7	Run Once
											G Stop
											C Select
											E Save
											Clear
											ClearCoun
											C Exit
											Group tage from different
											Save Log
											Read TID
											0
											2
											Read User
											0
											1
											Save Tag Log
											Priesize (MB) 5
											File format
											🖲 CSV 🕐 TXT
											Log File Path
											C:\Users\steve taol \Documents \CSLReader
lag r	ead = 1 F	Rate = 20 .	1 Tag/s	CRC = 0.0 Tag/s							

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For RFID Tag with **User bank** available, user can use C# Demo App to read User data.

Go to "Inventory" in Demo App. Tick the checkbox in the field "Read User". Fill in the blanks for

offset value and number of word read from User bank.

1h = 105	.100.23.203.3	enal = KEA4151	0650002								Control
sten	PC	XPC_W1	XPC_W2	SPC .	TID	USER	2228	Crist	Antenna Fort	CKC16	🔍 Run
											Q Run Once
											Stop
											Select
											E Save
											Clear
											ClearCour
											C Exit
											Group tags fro
											Save Log
											Read TID
											D
											1
											V Read User
							Off	iset —			0
							Numbe	er of Wor	·d —		E Save Tag Log FileSize (MB) 5
							read fr	om TID			StopAfterFiles 10
											File format
							bank				CSV CTXT
											C\Users\steve.tsol
											\Documents \CSLReader
		Land Annual Contractor	a and a start of the start of the								

Click "Run" and check the EPC to verify the tag with User data available, User data can be

checked in "USER" column

📴 IP = 19	02.168.25.205, S	erial = REA4135	SESCOD2	-				100 E			Control
Ledex	PC	XPC_W1	XPC_WI	LPC	TID	USEX.	KSSI	Count	Astenna Port	CICI 6	Run
0	3400			555566663C0000012		23456789	76.8	62	D	A4D7	Run Once
											Stop
											Select
											E Save
											Clear
											ClearCount
											C Exit
											Group tags from different
											🔄 Save Log
											Read TID
											0
						_					1
											Read User
											0
											2
											FileSize (MB) 5
											StopAfterFiles 10
											File format CSV C TXT
											Log File Path
											C:\Users\steve.tsdi \Documents \CSLReader
Tag r	ead = 1	Rate = 19.	.3 Tag/s	CRC = 0.0 Tag/s							-

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User can record the status of the CSL Reader in TXT format.

To record the status of the reader, user can tick the checkbox "Save Log" in Inventory mode.

Control						100		SES0002	ierial = REA4135	2.168.25.205, 9	IP = 19
Run	C2C16	Antenna Port	Count	RSSI	USER	TID	EDC	SEPC_W2	XPC_W1	PC	**
Run On											
Stop											
C Select											
E Save											
Clear											
ClearCa											
Clearco											
O Exit											
Group tags											
💟 Save Log											
Read TID											
D											
1											
Read User											
D											
2											
El Save Tag L FileSize (MB)											
StopAfterFiles											
File format											
CSV OTX											
Log File Path											
C:\Users\steve! \Documents \CSLReader											
						41	CRC = 0.0 Tag/s	3 Tag/s	Rate = 19.	ead = 1	ag re

Click "Run" and check the EPC data of the tags.

100	pre-	XDC WI	VPC WP	TRC .	TID	TISER	2 SST	Court	Antenna Bost	CRCIE	Run
~	3000		140,01	122400000000000000000000000000000000000		caut	50		0	0217	Due One
	3000			11110000000000000000000000000000000000			58 4	7	0	5853	Win Unce
	2000			456700000000000000000000			C7 4	1	0	0076	A Stop
	3000			345600000000000000000000			68	6	0	E911	Stop
	2000			111100000000000000000000000000000000000			THE	12	0	2244	C Select
	3000			111100000000000000000000000000000000000			56	12	0	D768	i o o o o o o
	3000			1111000000000000000153			65.6	9	0	ED58	E Save
	3000			1234000000000000000000			57.6	3	0	7EB9	
	2000			111100000000000000000000000000000000000			71.2	0	0	2606	Clear
	3000			123400000000000000000088			65.6		0	8297	
	2000			111100000000000000000000000000000000000			71.2	14	0	DALC	ClearCou
	3000			111100000000000000000000000000000000000			60.8	3	0	6B80	- F
	2000			122400000000000000000000			CIC	E.	0	ECOD	C Exit
	2000			5200690600000000000000000000000000000000			CC 4	0	0	4902	
	2000			111100000000000000000000000000000000000			60.4	c	0	E120	Groun tags fr
	2000			111100000000000000000000000000000000000			70.4	7	0	2265	different
	3000			111100000000000000000			62.2	-	0	5300	
	3000			11110000000000000000000			00.2	3	0	6602	Save Log
	3000			111100000000000000000			00.0	9	0	3333	_
	2000			111100000000000000000000000000000000000			60.0 E0.4	2	0	20213	
	3000			111100000000000000000			30.4	3	0	3023	E Read TID
	3000			111100000000000000000000000000000000000			07.0	14	0	FUFS	E need no
	3000			111100000000000000127			0/2	0	0	0340	0
	3000			111100000000000000000000000			60	9	0	1867	3. <u>5</u>
	3000			12.5400.00000.00000000000			01.0	1	0	8630	
	3000			1234000000000000000073			73.6	9	0	DUES	
	3000			1111000000000000000155			58.4	5	0	8090	E Read Hear
	3000			11110000000000000000000000			P.PC	10	U	BS3D	
	3000			11110000000000000012E			70.4	13	0	4201	0
	3000			1111000000000000000134			66.4	9	0	FIIA	
	3000			3456000000000000000000000000000000000000			8.00	0	0	7819	
	3000			111100000000000000000000000000000000000			63.2	0	0	3930	
	3000			12.34000000000000000000000000000000000000			64	5	0	61-38	III Carlo Tan La
	3000			111100000000000000138			61.6	4	0	0015	E Save rag Lo
	3000			12340000000000000000000			64.8	1	0	30A0	FileSize (MB) 5
	3000			1234000000000000000000000000000000000000			60.8	5	0	7378	
	3000			TTTTOUDOUDUUUUUUUUUUU			65.6	8	U	0498	StopAfterFiles 10
	3000			1111000000000000000000000000			61.6	5	0	7622	Eile fermet
	3000			1111000000000000000152			15.2	10	0	FD/A	File Iorinat
	3000			1111000000000000000124			59.2	6	0	E32B	O CSV () TXT
	3000			11110000000000000000143			57.6	3	0	FF6A	Les Cile Dath
	3000			111100000000000000000000000000000000000			64	5	0	A4DD	Log Flie Faul
	3000			11110000000000000000139			60.8	2	0	2087	C:\Users\steve ts
	3000			11110000000000000000151			63.2	5	0	CD19	\Documents
	3000			1111000000000000000128			61.6	5	0	22A7	CSLReader
	3000			1111000000000000000154			65.6	2	0	9DBC	
e.	3000			123400000000000000008A			61.6	4	0	A2D5	

Go to directory "Libraries > Documents > CSLReader", user can find the file which the reader status recorded in "CycleLog.Txt".

Organize 👻 🦳 Open 🕚	 Share with	ew folder		
Favorites	Documents library CSLReader			
V Dropbox	Name	Date modified	Туре	Size
Recent Places	CycleLog.Txt	22-08-2014 14:10	Text Docu	28 KB
Downloads	🐲 rea1135es0034.cfg	19-08-2014 16:50	CFG File	16 KB
Librarier	REA4135ES0005.cfg	18-08-2014 16:38	CFG File	16 KB
Documents	📰 fpa1133es0005.cfg	18-08-2014 09:45	CFG File	16 KB
A Music	FPA4133ES0005.cfg	29-07-2014 17:27	CFG File	16 KB
	💱 RFE2134PP0398.cfg	08-07-2014 15:41	CFG File	16 KB
	FPA7133ES0003.cfg	02-07-2014 15:32	CFG File	16 KB
Videos	2017.cfg	24-06-2014 16:13	CFG File	16 KB

Open the file "CycleLog.Txt". The reader status of number of tags per cycle and system reset

record can be found.

CycleLog.Txt - Notepad	And in case of the local division of the loc	_ • ×
<u>File Edit Format View</u>	Help	
23-08-2014 10:20:05 23-08-2014 10:20:05 23-08-2014 10:20:07 23-08-2014 10:20:09 23-08-2014 10:20:11 23-08-2014 10:20:18 23-08-2014 10:20:38	5 : Cycle 1, 269 Tag/Cycle, Channel State : CLEAR Cycle 2, 267 Tag/Cycle, Channel State : CLEAR Cycle 3, 251 Tag/Cycle, Channel State : CLEAR Cycle 4, 271 Tag/Cycle, Channel State : CLEAR S : System Reset Cycle 5, 421 Tag/Cycle, Channel State : CLEAR Cycle 6, 267 Tag/Cycle, Channel State : CLEAR	*
*		•

User can record the received tag data in CSV or TXT format.

To record the status of the reader, user can tick the checkbox "Save Tag Log" in Inventory

mode.

Input the Storage in "FileSize (MB)", in "StopAfterFiles", in "Log File Path"

IP = 19	2.168.25.205,	Serial = REA4135	ESO002	100 March 100			1000	1000			Control
adex	90	XPC_W1	3090_W3	RPC	TID	USER	RSSI	Court	Accessa Port	CRC14	Run
											Run Once
											C Stop
											C Select
											C Save
											Glean
											Clear
											ClearCour
											U Exit
											Group tags fro
											Save Log
											Read TID
											D
											1
											I'l Read User
											0
											1
											Save Tag Log FileSize (MB) 5
											StopAfterFiles 🔯
											File format
											Log File Path
											C:\Leers\steve.tsoi \Documents \CSLPcader
											and the state of t
ag re	ad = 0	Rate = 0 T	ag/s CR	C = 0 Tac/s							

Click "**Run**" to start Inventory. A message box "**Old Tag Files will be deleted**" will be prompted. The previous record will be clear before new tag data record start. Click "**OK**" to continue.

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The tag data record will be automatically saved. User can press "Stop" to stop the inventory

process.

U IP = 19	2.168.25.205 5	enal = REA4135	ES0002						1000			Control
laden	1C	NDC_W1	XDC_W2	EXC		CIT CIT	USER	R281	Count	Asteora Port	CEC16	O Run
1	3000			111100000000000000000000000000000000000	00151			74.4	2	0	CD19	Dun Ones
R.	3000			111100000000000000000000000000000000000	0011F			66.4	2	0	6413	Run Unce
2	3000			111100000000000000000000000000000000000	00011D			50.4	1	0	4451	A Stop
3	3000			111100000000000000000000000000000000000	000095			54.4	1	0	67E0	Stop
	3000			111100000000000000000000000000000000000	00152			79.2	4	0	FD7A	Select
5	3000			111100000000000000000000000000000000000	00128			72.8	1	0	22A7	Goologi
;	3000			123400000000000000000	000073			77.6	1	0	DCE3	B Save
7	3000			111100000000000000000000000000000000000	000125			65.6	3	0	F30A	
3	3000			111100000000000000000000000000000000000	0009B			62.4	2	0	862E	Clear
1	3000			111100000000000000000000000000000000000	00129			68.8	6	0	3286	
0	3000			111100000000000000000000000000000000000	00081			71.2	2	0	0306	ClearCoun
11	3000			111100000000000000000000000000000000000	00100			56	4	0	87CD	
12	3000			111100000000000000000	DOODEC			57.6	1	0	885E	S Exit
13	3000			111100000000000000000000000000000000000	000000			50.4	10	0	B4FC	10 Sec. 10
4	3000			111100000000000000000000000000000000000	000078			55.2	2	0	4863	Group tage iron
5	3000			111100000000000000000000000000000000000	00104			55.2	3	0	C749	different
6	3000			111100000000000000000000000000000000000	00127			68	4	0	D348	
17	3000			111100000000000000000000000000000000000	OOOFF			57.6	3	0	AAOC	Save Log
18	3000			111100000000000000000000000000000000000	000080			49.6	1	0	1327	12 22 12 12 12 12 12 12 12 12 12 12 12 1
9	3000			111100000000000000000000000000000000000	000135			69.6	1	0	E13B	
20	3000			111100000000000000000000000000000000000	000153			75.2	2	0	ED5B	Read TID
21	3000			111100000000000000000000000000000000000	0012A			59.2	2	0	02E5	I Need TID
22	3000			111100000000000000000000000000000000000	000136			65.6	2	0	D158	0
3	3000			111100000000000000000000000000000000000	00131			59.2	2	0	A1BF	1.32
4	3000			111100000000000000000000000000000000000	00004			68.8	1	0	F478	1
25	3000			111100000000000000000000000000000000000	0000A0			64	2	0	0116	
26	3000			1234000000000000000000000000000000000000	00077			65.6	1	0	9067	- Road Haar
27	3000			111100000000000000000000000000000000000	00130			63.2	2	0	7012	E Read Oaler
8	3000			111100000000000000000000000000000000000	000101			68.8	6	0	97EC	0
29	3000			111100000000000000000000000000000000000	000092			46.4	1	0	1707	-
80	3000			11110000000000000000	00128			52.8	2	0	1204	1
1	3000			111100000000000000000000000000000000000	00132			52.8	3	0	91DC	
2	3000			111100000000000000000000000000000000000	000141			55.2	1	0	DF28	Saue Tag Los
33	3000			111100000000000000000000000000000000000	000105			57.6	2	0	D768	V Save ray Log
14	3000			111100000000000000000000000000000000000	0000F0			65.6	1	0	5BE3	FileSize (MB) 5
35	3000			111100000000000000000000000000000000000	81000			53.6	1	0	2705	C 40 51 10
16	3000			111100000000000000000000000000000000000	000E4			64.8	1	0	1867	StopAfterFiles 1
17	3000			111100000000000000000000000000000000000	CROOOL			52	1	0	F4D9	File format
18	3000			111100000000000000000000000000000000000	0011E			59.2	2	0	7432	a col o put
9	3000			111100000000000000000000000000000000000	OOOBE			512	1	0	F2F9	O CSV O IXI
0	3000			12340000000000000000	HOODSC.			62.4	2	0	C213	Los File Path
11	3000			1234000000000000000000000000000000000000	000089			68	2	0	9286	
12	3000			12340000000000000000	00067			63.2	2	0	BE56	L: Users \steve tso
13	3000			111100000000000000000000000000000000000	00117			42.4	1	0	E51B	VDocuments
4	3000			111100000000000000000000000000000000000	0000F6			52	2	0	3825	VLOL neader
15	3000			123400000000000000000	00000			51.6	1	0	9217	
									2			

Go to directory "Libraries > Documents > CSLReader", user can find the file which the tag data

recorded in "TagLog1.csv".

ganize 🔻 😰 Open	 Share with	ew folder		
Favorites	Documents library CSLReader			
Dropbox	Name	Date modified	Туре	Size
Recent Places	TagLog1.csv	22-08-2014 16:44	Microsoft	292 KB
Downloads	CycleLog.Txt	22-08-2014 16:40	Text Docu	1 KB
Libraries	🗾 rea1135es0034.cfg	19-08-2014 16:50	CFG File	16 KB
Documents	💱 REA4135ES0005.cfg	18-08-2014 16:38	CFG File	16 KB
Music	💱 fpa1133es0005.cfg	18-08-2014 09:45	CFG File	16 KB
Dictures	FPA4133ES0005.cfg	29-07-2014 17:27	CFG File	16 KB
Subversion	RFE2134PP0398.cfg	08-07-2014 15:41	CFG File	16 KB
Videos	FPA7133ES0003.cfg	02-07-2014 15:32	CFG File	16 KB
Videos	REA7124ES0017.cfg	24-06-2014 16:13	CFG File	16 KB

The tag data can be checked in the CSV file: EPC, Reader ID, Timestamp, RSSI, tag count and

antenna port.

	TagL	og1.csv - Microsoft Excel			
Home Insert Page Layout	Formulas Data	Review View Acrobat	Team	(🛛 🗕 🗖 🗙
新細明體 × 11 × B Z 単 × A × abc ×	= = = = = Genera = = = = = = = = · · · · · · · · · · · ·	Conditional Formattin	g ▼ 📑 🖙 Insert ▼ 🚰 Delete ▼	Sort & Find &	
Clipboard G Font G	Alignment S Numb	er 🗟 Styles	Cells	Editing	
H11 - (fx					×
A	В	С	D E	F G	Н
1 1111000000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.596 UTC	72.8	0 0	
2 1111000000000000000011F	REA4135ES0002	2014-08-22 16:43:34.596 UTC	65.6	0 0	
3 1111000000000000000011D	REA4135ES0002	2014-08-22 16:43:34.596 UTC	50.4	0 0	
4 1111000000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.612 UTC	54.4	0 0	
5 1111000000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.612 UTC	79.2	0 0	
6 1111000000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.612 UTC	72.8	0 0	
7 1234000000000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.612 UTC	77.6	0 0	_
8 1111000000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.627 UTC	б4	0 0	_
9 11110000000000000000009B	REA4135ES0002	2014-08-22 16:43:34.627 UTC	62.4	0 0	_
10 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.658 UTC	63.2	0 0	
11 11110000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.658 UTC	71.2	0 0	
12 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.674 UTC	62.4	0 0	
13 1111000000000000000000C	REA4135ES0002	2014-08-22 16:43:34.674 UTC	57.6	0 0	
14 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.674 UTC	75.2	0 0	
15 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.690 UTC	56	0 0	
16 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.705 UTC	52.8	0 0	
17 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.736 UTC	79.2	0 2	
18 111100000000000000000000000000000000	REA4135ES0002	2014-08-22 16:43:34.736 UTC	58.4	0 2	
10 11110000000000000000000000000000000	REA1135ES0002	2014 08 22 16-43-34 726 HTC	70 /	<u>ni ni</u>	
Ready				100% 🕞 💷 🛡	• .::

8 PC Software Upgrade

8.1 PC Demo Application Upgrade

User can visit the CSL website (<u>http://www.convergence.com.hk</u>) > Downloads & Support > CS468 to find the latest release software for upgrade of CSL Reader

low www.convergence.com	hk/downloads-support	-2/cs203/			⊽ C ⁱ	🔷 - default-	search.net	Q
		ERGENCE	"CSL pro easy to use, an	ducts are high performanc d flexible for custom progr	oe, amming."	Seam	:h	
	SOLUTIONS	PRODUCTS	CUSTOM SERVICES	DOWNLOADS & SUPPORT	PARTNERS	NEWS	ABOUT US	CONTACT
	DOWNLOADS • CS101 • CS203 • CS468 • CS468 • CS469 • CS461 • CS713 • CS778 • CG778 • CG778 • CG778 • CG700 • Cold Chain • BAP ID Card • Dual Moderal • RTLS • Accessories	PID Card	Home + Downloads & Sup C S203 Download and Supp Download and Supp For General Us User's Manual File CS203ETHER Integrat	ed RFID Reader User's Manual	Late 4 St	est Version	Note User's M CS203E1 Integrate	anual for IHER d RFID Reader
			Installers C# Native Single Read	ler on Windows OS with User Inte	Late	est Version 2014	Note Demo Ap	pp in C# Native,

1

8.2 PC Demo Application Upgrade - For User

1. In the section "Demo App", check the latest version of Demo Application and download it.

Installers		Latest Version	Note	
C# Native Single Rea	ader on Windows OS with User Interface	Aug 2014	Demo App in C# N connects to 1 read	ative, Ier
C# Native Multi-Read Prompt	ers on Windows OS using Command	Aug 2014	Demo App in C# N connects to multip readers	ative, Ie
Java Over C++ Single Interface	Reader on Windows OS with User	Jan 2014	Demo App in Java C++, connects to 1 reader	Over
Java Native (Low Lev with User Interface	el API) Multi-Readers on Windows OS	Jan 2014	Demo App in Java Native, connects to multiple readers	0
CSL Adaptor (Multi-R OS in Java (Low Leve	eaders) for Rifidi Edge Server on Window I API)	Jul 2014	Adaptor for Rifidi E Server, connects to multiple readers	Edge
C (Low Level API) Mu Prompt	lti-Readers on Linux OS using Command	Jul 2014	Demo App in C on Linux OS, connect: multiple readers	s to
Special Notes				
Special Notes Files Ethernet Connection	Problems and Handling Methods	Latest Version Mar 2014	Note	
Special Notes Files Ethernet Connection	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus	Latest Version Mar 2014 Derformance,	Note	¥ in
Special Notes Files Ethernet Connection CONVERGENCE SYSTEMS LIMITED	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus	Latest Version Mar 2014 Derformance, stom programming	Note	▶ în
Special Notes Files Ethernet Connection CONVERGENCE SYSTEMS LIMITED ONS PRODUCTS	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus CUSTOM SERVICES DOWNLOADS & S	Latest Version Mar 2014 Derformance, stom programming	Note D." Search ERS NEWS AB	
Special Notes Files Ethernet Connection CONVERGENCE SYSTEMS LIMITED ONS PRODUCTS LOAD & SUPPORT - LLER - CSHARP - E READER	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus CUSTOM SERVICES DOWNLOADS & S Home » Download & Support – Installer – CSha Download & Support – Installer	Latest Version Mar 2014 Derformance, stom programming support PARTNE rp – Single Reader – CSharp – Singl	Note D." Search ERS NEWS AB	UT US CONT
Special Notes Files Ethernet Connection CONVERGENCE SYSTEMS LIMITED ONS PRODUCTS LOAD & SUPPORT - LLER - CSHARP - E READER	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus CUSTOM SERVICES DOWNLOADS & S Home » Download & Support – Installer – CSha Download & Support – Installer C# Native Demo App – Single Re	Latest Version Mar 2014 Derformance, stom programming support PARTNE rp – Single Reader – C Sharp – Single eader	Note D." Search ERS NEWS AB	UT US CONT
Special Notes Files Ethernet Connection CONVERGENCE SYSTEMS LIMITED ONS PRODUCTS LOAD & SUPPORT - LLER - CSHARP - E READER	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus CUSTOM SERVICES DOWNLOADS & S Home » Download & Support – Installer – CShar Download & Support – Installer C# Native Demo App – Single Re Installer	Latest Version Mar 2014 Derformance, stom programming SUPPORT PARTNE rp – Single Reader – CSharp – Single Pader	Note D." Search ERS NEWS AB Ie Reader Version	UIT US CONT
Special Notes Files Ethernet Connection CONVERGENCE SYSTEMS LIMITED ONS PRODUCTS LOAD & SUPPORT - LLER - CSHARP - E READER	Problems and Handling Methods "CSL products are high p easy to use, and flexible for cus CUSTOM SERVICES DOWNLOADS & S Home » Download & Support – Installer – CSha Download & Support – Installer C# Native Demo App – Single Re Installer CSL RFID Demo App 3.1.88_InstallerOnly.2	Latest Version Mar 2014 Deerformance, etom programming SUPPORT PARTNE rp – Single Reader = CSharp – Single eader	Note D." Search ERS NEWS AB Ie Reader Version 15 Aug 2014 (Latest)	Vote CS Library 3.0.56 refease notes

2. Uninstall the original Demo App previous installed in PC.

Control Panel Home	Uninstall or change a program	
View installed updates	To uninstall a program, select it from the list and then click	Uninstall, Change, or Repair.
Turn Windows features on or		
off	Organize 🔻 Uninstall Change Repair	
Install a program from the network	Name	Size
	Corel WinDVD	300 MB
	😽 Create Recovery Media	8.05 MB
	Crystal Reports Basic for Visual Studio 2008	173 MB
	Crystal Reports Basic Runtime for Visual Studio 2008 (x64)	64.6 MB
	CS Native Demo XP (VS2008)	1.75 MB
	CS RFID Java Demo	1.66 MB
	CS101 SerialComm Setup	48.0 KB
	CS203 DEMO XP(VS2008)	908 KB
	CS203 Java Multiple Reader Demo	380 KB
	CS203JavaMultipleReadersDemo	748 KB
	CS468 Callback Demo CSNET35 MSI	1.30 MB

3. Unzip and install the latest Demo App.

nize 🔻 🛛 🙀 Install 🔻	Share with 🔻 🛛 Burn 🔹 New folder			
avorites	Name	Date modified	Туре	Size
Desktop	👸 CS Native Demo XP Setup VS2008.msi	15-08-2014 17:46	Windows Installer	1,101 KB
Dropbox	CSL RFID Demo Build 3.1.88.txt	15-08-2014 17:50	Text Document	5 KB
Recent Places Downloads	🔯 setup.exe	15-08-2014 17:46	Application	362 KB
braries Documents _E Music Pictures Subversion				

8.3 PC Demo Application Upgrade - For Developer

1. In the section "Software Development Kit", check the latest version of SDK and download it.

For Developer

Software Development Kit

SDK	Latest Version	Note
C# Native Single Reader on Windows OS with User Interface	Aug 2014	Source Code, Libraries, Binaries and Reference Manual for Single Reader in C#
C# Native Multi-Readers on Windows OS using Command Prompt	Aug 2014	Source Code, Libraries, Binaries and Reference Manual for Multiple Readers in C#
Java Over C++ Single Reader on Windows OS with User Interface	Feb 2014	Source Code, Libraries, Binaries and Reference Manual for Single Reader in Java
Java Native (Low Level API) Multi-Readers on Windows OS with User Interface	Feb 2014	Source Code, Libraries, Binaries and Reference Manual for Multiple Readers in Java
C (Low Level API) Multi-Readers on Linux OS using Command Prompt	Jul 2014	Source Code for Multi- Readers in C on Linux OS

	/ERGENCE MS LIMITED	"CS at half t	101 reads twice as far he price of competitors.'	í	Search		
SOLUTIONS	PRODUCTS	CUSTOM SERVICES	DOWNLOADS & SUPPORT	PARTNERS	NEWS A	BOUT US	CONTAC
	& SUPPORT -	Home » Download & Supp	ort – SDK – CSharp – SingleReade	ar Na sta Da sada a			
SINGLEREAD	(P – DER	Download & Supp C# Native SDK -	oort – SDK – CSharp – S Single Reader	Singlekeadel			
SINGLEREAD	IP – JER	C# Native SDK -	oort – SDK – CSharp – S Single Reader ent Kit	Ver	sion	Note	
SUR – CSHAN	(P - Der	C# Native SDK - Software Developme CSL RFID Demo Build	Single Reader ent Kit 3.1.88.zlp	Vers 15 A	sion ug 2014 (Lates	Note t) CS Libra release	ry 3.0.58 notes

janize 🔻 🛛 🔚 Open	Include in library 👻 Share with 👻	Burn New folder		
Favorites	Name	Date modified	Туре	Size
📃 Desktop	Documents	17-10-2011 12:51	File folder	
😌 Dropbox	腸 Release Binaries	09-12-2013 17:46	File folder	
🔛 Recent Places	길 Release Libraries	25-01-2014 09:52	File folder	
📕 Downloads	Je Source	09-12-2013 17:29	File folder	
	🕞 CSL Demo Apps For VS2008.sln	03-12-2013 14:57	Microsoft Visual S	6 KB
Libraries	CSL Demo Apps For VS2008.suo	07-08-2014 10:21	Visual Studio Solu	96 KE
Documents	CSL RFID Demo Build 3.1.88.txt	15-08-2014 17:50	Text Document	5 KB

2. Unzip and check the "Release Libraries".

3. Copy the SDK Library folders inside the folder "Release Libraries" and replace the folders in "Release Libraries" in current Developer's project.

and a part	Share with 💌 Burn New fo	older		
Favorites	Name	Date modified	Туре	Size
Desktop	WindowsCE	01-11-2013 15:38	File folder	
Dropbox	🍌 WindowsXP	01-11-2013 15:59	File folder]
Recent Places				
Downloads				
Libraries				
Documents				
Music				

4. Open the Developer's project in Microsoft Visual Studio. Rebuild the project with latest SDK libraries.



9 Software Development Kit for Developer

9.1 Introduction

This chapter will describe the details about the CS468 Software Development Kit for Developer. Software developers can refer to this demo program for programming

- High Level API and Low Level API
- C# / Java / C
- Single Reader / Mulit-Reader

9.2 **Program Structure**

The Demo Application folder consists of the following directories:

CSL CALLBACK API CUST	Source code of the Multi-function Demo Application program (e.g. inventory, read and write etc)
CSL GPIO	Source code to demonstrate the GPIO and IP setting function of the reader
CSLibrary	All necessarily dll library files
DEMO	Installer of the Multi-function Demo Application program (e.g., inventory, read and write etc)
Document	User Documents: API Library manual, User Manual, etc.

9.3 Build Project Requirements

To run the CSL Demo application programs, the PC must have the following software installed:

1) Dot Net Framework 3.5 or above

It is available in Windows 7 or above and it is downloadable from Microsoft website.

The software can be downloaded from CSL website (http://www.convergence.com.hk/) > Downloads & Support area.

SDK - "C# Native Single Reader on Windows OS with User Interface" and "C# Native Multi-Readers on Windows OS using Command Prompt":

To build demo application successfully, you need to install Microsoft Visual Studio 2008 (with Visual C# component) or above. For more detailed information, please go to Microsoft webpage (http://msdn.microsoft.com/en-us/vstudio/default.aspx).

SDK - "Java Over C++ Single Reader on Windows OS with User Interface" and "Java Native (Low Level API) Multi-Readers on Windows OS with User Interface":

To build demo application successfully, you need to install NetBeans IDE and Java SE Development Kit 7 Update 51 or above. For more detailed information, please go to Oracle's webpage

(http://www.oracle.com/technetwork/java/javase/downloads/jdk-7-netbeans-download-432126.ht ml).

SDK - "C (Low Level API) Multi-Readers on Linux OS using Command Prompt":

To build demo application successfully, you need to install Ubuntu with GCC compiler. For more detailed information, please go to Ubuntu's webpage

(http://www.ubuntu.com/download/desktop).

10 Reader Firmware Upgrade

10.1 Reader Connection

Before doing firmware upgrade, please ensure the reader is connected properly to PC via an **Ethernet Switch / Router** and can be operated using CSL Demo App provided. (e.g. run "Inventory" in CSL Demo App). DO NOT DIRECT CONNECT PC TO READER.



If the firmware upgrade fails during the process, user must POWER OFF and POWER ON the reader again before redoing firmware upgrade.

10.2 Firmware Upgrade Procedure Overview

CSL CS203, CS468 and CS469 Readers have 1 RFID Processor and 1 Network Processor for RFID application and network application. The application firmware can be upgradable via PC software provided (RFID FwUpgrade X.X.XX.exe).



Firmware files

The Firmware Compatibility Table shows that current CSL RFID readers with RFID Application version 1.3.xx and v1.4.xx do not include RFID Bootloader. Therefore if user wants to do firmware upgrade of RFID Application from v1.3.xx / v1.4.xx to v1.5.xx, user must install the RFID Bootloader to the reader before upgrading the RFID Application to the latest version (v1.5.xx or after).

RFID App	RFID Bootloader	Network Processor App	Network Processor Bootloader
v1.3.xx	No Bootloader	All, up to v2.18.46	All, up to v2.9.4
v1.4.xx	No Bootloader	All, up to v2.18.46	All, up to v2.9.4
v1.5.xx	v1.0.00 / v1.0.01	v2.18.46	v2.9.4

Firmware version for RFID Reader CS203 / CS468 / CS469

The flow diagram for Firmware Upgrade procedure



10.3 Network Processor Firmware Upgrade Procedure

1. Please download the latest Firmware Upgrade tool from CSL website

(http://www.convergence.com.hk/download-support-firmware-upgrade-tool/). The latest

version is "RFID FwUpgrade2.0.27.zip".

 Download the latest bootloader and application firmware from "Firmware - Network Processor Bootloader" and "Firmware - Network Processor Application".



3. Unzip "RFID FwUpgrade2.0.27.zip".

Run "RFID FwUpgrade.exe" for CSL reader is connected to PC via USB or Ethernet.

"**RFID FwUpgrade_Usb.exe**" is used for CSL reader is connected to PC via USB only. Do not connect via Ethernet when using "**RFID FwUpgrade_Usb.exe**"

"**RFID FwUpgrade_Net.exe**" is used for CSL reader is connected to PC via Ethernet only. Do not connect via USB when using "**RFID FwUpgrade_Net.exe**"

Please run the exe file by double clicking the file within this directory only.

)rganize 🔻 🛛 Include in lik	orary 🔹 Share with 🔹 Burn	New folder		
Favorites	Name	Date modified	Туре	Size
Nesktop	SLibrary.dll	08-08-2014 11:36	Application extension	234 KB
😌 Dropbox	SLibrary.Windows.dll	29-05-2012 16:17	Application extension	460 KB
🖳 Recent Places	CSLupgrade.log	08-08-2014 14:41	Text Document	1 KB
퉳 Downloads	📰 RFID FwUpgrade Net.exe	08-08-2014 11:36	Application	206 KB
	RFID FwUpgrade Usb.exe	08-08-2014 11:36	Application	205 KB
📕 Libraries	RFID FwUpgrade.exe	08-08-2014 11:36	Application	206 KB
Documents Music F Pictures Subversion Videos				
Computer				
🏭 Windows7_OS (C:)				
OVD RW Drive (E:) L				
RFID Processo	r Firmware Upgrader 2.0.27		-	
---------------	----------------------------	--------------------	---------------------	----------------
ţ.	Press "Search" button to s	search all CSL rea	ader in the same su	ıbnet
ų)	Network Interface Card	Selected: Intel(R)) WiFi Link 1000 B	GN
Search	192.168.25.203	Anngement	Upgrade	Appillenner
Connect	Direct Search	Clear	Marine Pilineense	.19(tilloondin

4. Click **[Search]** to check the target reader.

5. Click to select target device in the list. Click [Network Processor Bootloader].

RFID Processor Firmware Upgrader 2.0.27		
C \$468-4 IN T B Image V2.18.15	192.168.25.205 00.05.7B 82.02.85	
		1
Press "Conn	ect" or "Assignment" or other buttons.	
Network Interface Card Sele	ected: Intel(R) 82579LM Gigabit Network Connection	n
Stop 192.168.25.2	203 Assignment	2
Connect Drect Search	Gear Network Processor Bootloade	

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6. Choose the latest Network Processor Bootloader file downloaded from website.

Please choose Eboot update	ille		-		
🔵 🗢 📙 « Downloads	NetworkProcessor	+ + ₂	Search N	etworkProcess	or 🔎
Organize 🔻 New folder				•	1 0
🔆 Favorites 📩	Name	Date modifi	ed	Туре	
Nesktop	🛓 V2.9.4_F34X_BL.BIN	07-08-2014	10:06	VLC media f	ile (.bin)
 Secent Places Downloads ■ Libraries ■ Documents 			~ 1		
Music Pictures Subversion					
Computer	4		/	- 2	
File <u>n</u> an	re: V2.9.4_F34X_BL.BIN	۲	BIN files (* Open	(.bin)	▼ Cancel

Click [Open] to confirm.

7. The Network Processor Bootloader update process starts.

RFID Processor Firmware Upgrader 2.0.27 15 CS468-4 INT B 192.168.25.205 Image V2 18 15 00 05 7B 82 02 85 Update Progress OK Total percent : 67/100 j) Press "Connect" or "Assignment" or other buttons. **i**) Network Interface Card Selected: Intel(R) 82579LM Gigabit Network Connection Upgrade 192.168.25.203 Assignment Search Cear Network Processor Bootloader Direct Search Connect

Press **[OK]** when firmware update process finished

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8. The background colour of the target reader in the list is changed from green to yellow.

Click to select the target reader again.

RFID	Processor Firmware Upgrader 2.0.27	
Fir	5468-4 INT B mware Bootloader V2.9.4 (92.168.25.205 00:05:7B:82:02:85
I	Press "Connect" or "As	signment" or other buttons.
(į)	Network Interface Card Selected: Intel(R) 82579LM Gigabit Network Connection
	Stop 192.168.25.203	Upgrade signment Network Processor Application
C	Direct Search	Cear Herwork Processore Bid Buallot

9. If original Network Processor App version is V2.18.4 or after, you can <u>IGNORE</u> this step and jump to next step.

If original Network Processor App version is old and is **V2.18.3 or before**, after upgrading the bootloader, the IP, subnet and Gateway table will be messed up. You need to correct that. Press **[Assignment]** button and change the incorrect IP, subnet and gateway back such that it will match your PC. After that, continue with the next step of installing the Network Processor App.

RFID Processor Firmware I	Upgrader 2.0.27		
C S468-4 IN T B Firmware Bootload	der V2.9.4 192.168.25.205 00:05:7B:82:02:85		
	Assignment		Subnet Mask value
D	Device Name CS4684 INT B P 192 . 168 . 25 205		
G	Sateway 192 168 255 2 rustedIP 0 0 0 0 0		
	Trusted Enable		
ų l	Assign	uttons.	
Vetwork Interfa	ace Card Selected: Intel(R) 82579LM Gigab	it Network Connection	
Stop 192	2.168.25.203 Assignment Network	k Processor Application	
Connect Direc	d Search Clear Humand	Housener Holdenoor	

- RFID Processor Firmware Upgrader 2.0.27 — — X CS468-4 INT B 192.168.25.205 irmware Bootloader V2.9.4 00:05:7B:82:02:85 (j) Press "Connect" or "Assignment" or other buttons. i Network Interface Card Selected: Intel(R) 82579LM Gigabit Network Connection Upgrade 192.168.25.203 Assignment Network P Clear Direct Search
- 10. Press [Network Processor Application]

11. Choose the latest Network Processor application file downloaded from CSL website. Click **[Open]** to confirm and start.



12. The Network Processor application update process starts.

Press [OK] when firmware update process finished.

	Update Progress			
	Tablance	4.54/100	OK	
		t : 54/ IUU		
į)	Press "Connect" of	or "Assignme	nt" or other button	S.
		1.6.000.0005	701 M Circohit Not	work Connection
i) Network Interf	ace Card Selected:	Intel(R) 8257	I SLIVI GIGabit Net	work Connection

13. The Network Processor application firmware is updated to the latest version.

C \$468- Image V	1 INT B 2 18 46	192.168. 00.05.7B	25.205 82 02 85
(i)	Droce "	opport" or "Accorporation	" or other buttons
ţ)	Press "	Connect" or "Assignmen	" or other buttons.
U Netr	Press " vork Interface Carc	Connect" or "Assignmen Selected: Intel(R) 82579	" or other buttons. PLM Gigabit Network Connection
U Netv	Press " vork Interface Card 192.168.	Connect" or "Assignmen Selected: Intel(R) 82579 25.203	" or other buttons. PLM Gigabit Network Connection

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10.4 RFID Processor Firmware Upgrade Procedure

Use MUST upgrade the firmware of Network Processor to the latest version before upgrade firmware of RFID Processor. Please follow the chapter "Network Processor Firmware Upgrade Procedure" in this document to do firmware upgrade for Network Processor.

10.4.1 Procedure for CSL reader with RFID Processor App version 1.3.xx or 1.4.xx

 User must check the RFID Firmware version before doing RFID Firmware upgrade. If the RFID Firmware Vers is 1.5.xx, please refer to section "4.2 Procedure for CSL reader with RFID Firmware App 1.5.xx".

IP = 192.168.25.20	9, MAC = REA4135ES0003	X
Inventory	PC Side Version:	
ReadWrite	C# Native 3.0	3 1 4 2
WriteAny	CSLib Vers	3.0.23
Geiger	Reader Side Version:	
Security	RFID Firmware Vers	1.3.70
occurry	Network ProcBootLoader	2.9.03
Kill	Network Proc 8051 App	2.18.15
C \$9010	Frequency Profile : ETSI	
ColdChain	Fixed Frequency : 866.3 M	Hz
	Profile : 2	
Monza4QT	Power: 300	
G2iL/M	Device Type: CS468INT	
G2iL Func		
Set Interfac		
Temp Mon		
InvGPIOSyn		
InvGPIOAsyn		
Setup		
Exit	CONVER SYSTEMS I	GENCE IMITED

2. Please download the latest Firmware Upgrade tool from CSL website. The latest version is

"RFID FwUpgrade2.0.27.zip".

3. Download the latest bootloader and application file for RFID Processor from "Firmware - RFID

Processor Bootloader" and "Firmware - RFID Processor Application".

load-support-firmware-rfidproces	sor/		⊤ C	🤣 🔹 defau	lt-search.net	
CONVERGENCE SYSTEMS LIMITED	"CSL pro easy to use, and	ducts are high performan d flexible for custom prog	ce, ramming."	Sea	arch	y in si
DUTIONS PRODUCTS	CUSTOM SERVICES	DOWNLOADS & SUPPORT	PARTNERS	NEWS	ABOUT US	CONTACT
OWNLOAD & SUPPORT - IRMWARE - FIDPROCESSOR	Home » Download & Supp Download & Supp	oort – Firmware – RFIDProcessor port – Firmware – RFIDP	rocessor			
	Firmware - RFID	Processor Bootloader				
	File		Vers	sion	Note	
	bootloader_V1001.a79		v1.0	1 (Latest)	Only nee firmware v1.4.xx	d if your is v1.3.xx or
	Firmware - RFID	Processor Application				
	Firmware - RFID	Processor Application	Ver	sion	Note	
	Firmware - RFID File Image_V1527.a79	Processor Application	Ver : v1.5	sion 27 (Latest)	Note Fix write	error
	Firmware – RFID File Image_V1527.a79 image_V1526.a79	Processor Application	Ver v1.5 v1.5.	sion 27 (Latest) 26	Note Fix write Add Ucon encoding	error de 7 parallel)

4. Unzip "RFID FwUpgrade2.0.27.zip".

Run "RFID FwUpgrade.exe" for CSL reader is connected to PC via USB or Ethernet.

"**RFID FwUpgrade_Usb.exe**" is used for CSL reader is connected to PC via USB only. Do not connect via Ethernet when using "**RFID FwUpgrade_Usb.exe**"

"**RFID FwUpgrade_Net.exe**" is used for CSL reader is connected to PC via Ethernet only. Do not connect via USB when using "**RFID FwUpgrade_Net.exe**"

Please run the exe file by double clicking the file within this directory only.

rganize 🔻 🛛 Include in li	brary Share with Burn	New folder		
Favorites	Name	Date modified	Туре	Size
Nesktop	🚳 CSLibrary.dll	08-08-2014 11:36	Application extension	234 KB
😌 Dropbox	🚳 CSLibrary.Windows.dll	29-05-2012 16:17	Application extension	460 KB
🖳 Recent Places	CSLupgrade.log	08-08-2014 14:41	Text Document	1 KB
👃 Downloads	📧 RFID FwUpgrade Net.exe	08-08-2014 11:36	Application	206 KB
	RFID FwUpgrade Usb.exe	08-08-2014 11:36	Application	205 KB
Jibraries	RFID FwUpgrade.exe	08-08-2014 11:36	Application	206 KB
Music F Pictures Subversion Videos				
Computer				
Windows7_OS (C:)				

- FILD Processor Firmware Upgrader 20.27

 Image: Constant of the second s
- 5. Click Search to check the target reader

6. Choose target device in the list. Click [Connect] to connect to the target reader.



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7. Check the current version of the firmware. Click [Open].

MESSAGE: RFID Fwupde	ater version = 2.0.27
MESSAGE: Device Type :	= CS468IN1
MESSAGE: Current firmwa	and Discount (UCD only to do not pourse off
MESSAGE: Set Reader to	Network connection interface
MESSAGE: Set Interface	Success
HEJONAL. JEL INCHOUS	50000000 5000000
Open	Start Update

8. Choose the RFID bootloader firmware file "bootloader_V1001.a79".

Click [Open] to confirm.

🔵 🗢 🔰 🕨 Steve Tsoi	Downloads RFIDProcessor	✓ 4y Search RFIDProcess	or P	
Organize 👻 New folder		832 .	• 🔟 🔞	
🔆 Favorites 🕺	Name	Date modified	Туре	
Marktop	bootloader_V1001.a79	30-06-2014 10:41	A79 File	•
 Dropbox Recent Places Downloads 	image_V1527.a79	20-06-2014 09:11	A79 File	
Libraries Documents Documents Music Pictures Subversion				
Videos				
Windows7_OS (C:)	• [-	
File <u>n</u> an	e: bootloader_V1001.a79	 ✓ firmware files (*.a79) Open 	Cancel	

9. Press [Start Update] to start firmware update process.



10. Wait until the firmware update process is finished.

DO NOT unplug the reader during the process.



11. At the end of the firmware update process, click [Close] to exit the Firmware Upgrade

window.

RFID Processor Firmware Upgrade 2.0.27	
WARNING: Do not disconnect Ethernet/USB cable, do not power off MESSAGE: Set Reader to Network connection interface MESSAGE: Set Interface Success	*
MESSAGE: Open "C:\Users\steve.tsoi\Downloads\RFIDProcessor \bootloader_V1001.a79"	
MESSAGE: Start Update Firmware, please wait WARNING: DO NOT UNPLUG READER DURING UPDATE !!	
MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode MESSAGE: Rehoot for the first time	=
MESSAGE: Nonvolatile memory update on reader succeeded	
MESSAGE: Bootloader is in Network Mode MESSAGE: OEM Address 0xA4 = 0x05 (CS468INT)	
MESSAGE: Please press "Close" button to finish.	-
Open Start Update Close	

12. Choose target device in the list. Click [Connect] to connect to the target reader.

RFID Processor Firmwa	re Upgrader 2.0.27			×
C S468-4 INT C Image V2.18.46		192.168.25 00:05:7B 82	.205 2.02:88	
4	Press "Connect" o	r "Assignment" (or other buttons.	
Network Inte	rface Card Selected:	Intel(R) 82579L	M Gigabit Network	Connection
Stop 1	92.168.25.203	Assignment	Upgrade	Application
Connect D	irect Search	Clear	Network Processo	r Bootloader

13. Check the current version of the firmware. If Current firmware version = 1.0.01, the

bootloader is successfully installed in previous steps.

To continue, click [Open].



14. Choose the latest RFID Processor application file.

Click [Open] to confirm.



15. Press [Start Update] to start firmware upgrade process.

RFID Processor Firmware Upgrade 2.0.27
MESSAGE: RFID Fwupdeater version = 2.0.27
MESSAGE: Device Type = CS468INT
MESSAGE: Current firmware version = 1.0.01
WARNING: Do not disconnect Ethernet/USB cable, do not power off
MESSAGE: Set Reader to Network connection interface
MESSAGE: Set Interface Success
WARNING: Please select firmware file first MESSAGE: Open "C:\Users
\steve.tsoi\Downloads\RFIDProcessor\image_V1527.a79"
Open Start Update Close

16. Wait until the firmware update process is finished.

DO NOT unplug the reader during the process.

RFID Processor Firmware Upgrade 2.0.27
MESSAGE: RFID Fwupdeater version = 2.0.27
MESSAGE: Device Type = CS468INT
MESSAGE: Current firmware version = 1.0.01
WARNING: Do not disconnect Ethernet/USB cable, do not power off
MESSAGE: Set Reader to Network connection interface
MESSAGE: Set Interface Success
WARNING: Please select firmware file first MESSAGE: Open "C:\Users
\steve.tsoi\Downloads\RFIDProcessor\image_V1527.a79"
MESSAGE: Start Update Firmware, please wait
WARNING: DO NOT UNPLUG READER DURING UPDATE !!
MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode
MESSAGE: Reboot for the first time
Open Start Undate Close
open

17. At the end of the firmware update process, click [Close] to exit the Firmware Upgrade

window.

RFID Processor Firmware Upgrade 2.0.27	
\steve.tsoi\Downloads\RFIDProcessor\image_V1527.a79" MESSAGE: Start Update Firmware, please wait WARNING: DO NOT UNPLUG READER DURING UPDATE !! MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode MESSAGE: Reboot for the first time	
SSAGE: Reboot for the second time MESSAGE: Write OEM 0x3c4 to 0x80000000 success, reader ready in application mode MESSAGE: Nonvolatile memory update on reader succeeded MESSAGE: Bootloader is in Network Mode MESSAGE: OEM Address 0xA4 = 0x05 (CS468INT) MESSAGE: Please press "Close" button to finish.	E
Open Start Update Close	

18. Quit RFID FwUpgrade.

19. Open CSL C# Native Demo App. The updated firmware version can be checked.



10.4.2 Procedure for CSL reader with RFID Processor App version 1.5.xx or after

1. User must check the RFID Firmware version before doing RFID Firmware upgrade. If the

RFID Firmware Vers is 1.3.xx and 1.4.xx, please refer to section "4.1 Procedure for CSL reader with RFID App version 1.3.xx and 1.4.xx)".



 Please download the latest Firmware Upgrade tool from CSL website. The latest version is "RFID FwUpgrade2.0.27.zip". Download the latest bootloader and application file for RFID Processor from "Firmware - RFID Processor Bootloader" and "Firmware - RFID Processor Application".

load-support-firmware-rfidprocess	sof/		⊤ C'	🔷 * defau	lt-search.net	
CONVERGENCE SYSTEMS LIMITED	"CSL pro- easy to use, and	ducts are high performanc I flexible for custom progra	e, amming."	Se	arch	¥ in äa C
OLUTIONS PRODUCTS	CUSTOM SERVICES	DOWNLOADS & SUPPORT	PARTNERS	NEWS	ABOUT US	CONTACT
DOWNLOAD & SUPPORT - FIRMWARE - RFIDPROCESSOR	Home » Download & Supp Download & Supp	ort – Firmware – RFIDProcessor port – Firmware – RFIDPr	ocessor			
	Firmware - RFID	Processor Bootloader				
	File		Vers	ion	Note	
	bootloader_V1001.a79		v1.0.	1 (Latest)	Only nee firmware v1.4.xx	ed if your Fis <mark>v</mark> 1.3.xx or
	Firmware - RFID	Processor Application				
	File		Vers	ion	Note	
	image_V1527.a79		v1.5.	27 (Latest)	Fix write	error
	image_V1526.a79		v1.5.	26	Add Uco encoding	de 7 parallel 9

4. Unzip "RFID FwUpgrade2.0.27.zip".

Run "RFID FwUpgrade.exe" for CSL reader is connected to PC via USB or Ethernet.

"**RFID FwUpgrade_Usb.exe**" is used for CSL reader is connected to PC via USB only. Do not connect via Ethernet when using "**RFID FwUpgrade_Usb.exe**"

"**RFID FwUpgrade_Net.exe**" is used for CSL reader is connected to PC via Ethernet only. Do not connect via USB when using "**RFID FwUpgrade_Net.exe**"

Please run the exe file by double clicking the file within this directory only.

)rganize 🔻 Include in lit	orary 🔻 Share with 👻 Burn	New folder		
Favorites	Name	Date modified	Туре	Size
Marktop	SLibrary.dll	08-08-2014 11:36	Application extension	234 KB
😌 Dropbox	SLibrary.Windows.dll	29-05-2012 16:17	Application extension	460 KB
🖳 Recent Places	CSLupgrade.log	08-08-2014 14:41	Text Document	1 KB
퉳 Downloads	📧 RFID FwUpgrade Net.exe	08-08-2014 11:36	Application	206 KB
	🔟 RFID FwUpgrade Usb.exe	08-08-2014 11:36	Application	205 KB
🗃 Libraries	RFID FwUpgrade.exe	08-08-2014 11:36	Application	206 KB
Music E Pictures Subversion Videos				
💂 Computer				
🏭 Windows7_OS (C:)				
DVD RW Drive (E:) L				

1							
į)	Pre	ss "Search'	' button to s	earch all C	SL reader i	n the sam	e subnet
(j) (j)	Pre	ss "Search' letwork Inter	' button to s face Card	earch all CS Selected: Ir	SL reader i tel(R) WiFi	n the sam Link 100	e subnet. 0 BGN
(j) (j)	Pre	ss "Search' letwork Inter	' button to s face Card	earch all C: Selected: In	SL reader i tel(R) WiFi	n the sam Link 100 [.]	e subnet. 0 BGN
i) i) Sear	Pre	ss "Search' letwork Inter 192.168	' button to s face Card .25.203	earch all C Selected: In	SL reader i tel(R) WiFi ^{Upgra}	n the sam Link 100 [.] de	e subnet. 0 BGN

5. Click Search to check the target reader

6. Choose target device in the list. Click [Connect] to connect to the target reader.



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7. Check the current version of the firmware. Click [Open].

RFID Processor	Firmware Upg	rade 2.0.27	-	
MESSAGE: R	FID Fwupdea evice Type =	ter version = 2.0 CS468INT).27	
MESSAGE: C	urrent firmwar	re version = 1.5.	20	
WARNING: D	o not disconr	nect Bhernet/U	SB cable, do	not power off
MESSAGE: S	et Reader to	Network connec	tion interfac	e
MESSAGE: S	et interface S	UCCESS		
í.				
I				
0	Open	Start Upda	ite	Close

8. If current bootloader firmware version is v1.0.01, go to Step 14.

If current bootloader firmware version is v1.0.00, choose the RFID bootloader firmware

file "bootloader_V1001.a79".

Click [Open] to confirm.

🖳 Open	the second s	the second s	×
🕞 🗢 🌙 🔸 Steve Tsoi 🔸	Downloads + RFIDProcessor	✓ 4 Search RFIDProcess	or P
Organize 🔻 New folder		Itt	
🔆 Favorites	Name	Date modified	Туре
🔜 Desktop	bootloader_V1001.a79	30-06-2014 10:41	A79 File
Propbox Recent Places Downloads	image_V1527.a79	20-06-2014 09:11	A79 File
 ☐ Libraries ☐ Documents → Music ☐ Pictures ☐ Subversion ☑ Videos 			
🖳 Computer			
🕌 Windows7_OS (C:) 👻 ∢			,
File <u>n</u> ame:	bootloader_V1001.a79	 ✓ firmware files (*.a79) Open 	Cancel

9. Press [Start Update] to start firmware update process.

MESSAGE: Device Type = CS468INT	
MESSAGE: Current firmware version = 1.5.20	
WARNING: Do not disconnect Ethernet/USB cable, do not power off	
MESSAGE: Set Reader to Network connection interface	
MESSAGE: Set Interface Success	
MESSAGE. Upen C: Users steve.tsol Upownloads FIDFrocessor	
Wootlodder_vioo1.a/5	
Open Start Undate Close	
obert otare opulate Close	

10. Wait until the firmware update process is finished.

DO NOT unplug the reader during the process.

FID Processor Firmware Upgrade 2.0.27
MESSAGE: RFID Fwupdeater version = 2.0.27 MESSAGE: Device Type = CS468INT MESSAGE: Current firmware version = 1.5.20 WARNING: Do not disconnect Ethemet/USB cable, do not power off MESSAGE: Set Reader to Network connection interface MESSAGE: Set Interface Success MESSAGE: Open "C:\Users\steve.tsoi\Downloads\RFIDProcessor \bootloader_V1001.a79" MESSAGE: Start Update Firmware, please wait WARNING: DO NOT UNPLUG READER DURING UPDATE !! MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode MESSAGE: Reboot for the first time *****
Open Start Update Close

11. At the end of the firmware update process, click [Close] to exit the Firmware Upgrade

window.

RFID Processor Firmware Upgrade 2.0.27	
WARNING: Do not disconnect Ethernet/USB cable, do not power off MESSAGE: Set Reader to Network connection interface MESSAGE: Set Interface Success	*
MESSAGE: Open "C:\Users\steve.tsoi\Downloads\RFIDProcessor \bootloader_V1001.a79"	
MESSAGE: Start Update Firmware, please wait WARNING: DO NOT UNPLUG READER DURING UPDATE !!	
MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode MESSAGE: Reboot for the first time	н
MESSAGE: Nonvolatile memory update on reader succeeded	
MESSAGE: Bootloader is in Network Mode MESSAGE: OEM Address 0xA4 = 0x05 (CS468INT)	
MESSAGE: Please press "Close" button to finish.	-
Open Start Update Close	

12. Choose target device in the list. Click [Connect] to connect to the target reader.

RFID Processor Firmwa	re Upgrader 2.0.27		- 12	×
C S468-4 INT C Image V2.18.46		1 92.168.25 00:05:7B 82	.205 2:02:88	
Ú)	Press "Connect" or	r "Assignment" (or other buttons.	
Network Inte	rface Card Selected:	Intel(R) 82579L	M Gigabit Network	Connection
Stop 1	92.168.25.203	Assignment	Upgrade	- Apphention
Connect D	irect Search	Clear	Network Processo	r Bootloader

13. Check the current version of the firmware. If Current firmware version = 1.0.01, the

bootloader is successfully installed in previous steps.

To continue, click [Open].



14. Choose the latest RFID Processor application file.

Click [Open] to confirm.



15. Press [Start Update] to start firmware upgrade process.

FID Processor Firmware Upgrade 2.0.27
MESSAGE: RFID Fwupdeater version = 2.0.27
MESSAGE: Device Type = CS468INT
MESSAGE: Current firmware version = 1.0.01
WARNING: Do not disconnect Ethernet/USB cable, do not power off
MESSAGE: Set Reader to Network connection interface
MESSAGE: Set Interface Success
WARNING: Please select firmware file first MESSAGE: Open "C:\Users
\steve.tsoi\Downloads\RFIDProcessor\image_V1527.a79"
Open Start Lindate Close
open Start opuate

16. Wait until the firmware update process is finished.

DO NOT unplug the reader during the process.

RFID Processor Firmware Upgrade 2.0.27					
MESSAGE: RFID Fwupdeater version = 2.0.27					
MESSAGE: Device Type = CS468INT					
MESSAGE: Current firmware version = 1.0.01					
WARNING: Do not disconnect Ethernet/USB cable, do not power off					
MESSAGE: Set Reader to Network connection interface					
MESSAGE: Set Interface Success					
WARNING: Please select firmware file first.MESSAGE: Open "C:\Users					
\steve.tsoi\Downloads\RFIDProcessor\image_V1527.a79"					
MESSAGE: Start Update Firmware, please wait					
WARNING: DO NOT UNPLUG READER DURING UPDATE !!					
MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode					
MESSAGE: Reboot for the first time					
Open Start Update Close					

17. At the end of the firmware update process, click [Close] to exit the Firmware Upgrade

window.

\eteve teni\Downloade\REIDProcessor\image V1527 a79"	
MESSAGE: Start Update Firmware, please wait	
WARNING: DO NOT UNPLUG READER DURING UPDATE !!	
MESSAGE: Write OEM 0x3c4 to 0 success, reader ready in bootloader mode	
MESSAGE: Reboot for the first time	
	ME
SSAGE: Reboot for the second time	100
MESSAGE: Write OEM 0x3c4 to 0x80000000 success, reader ready in	
application mode	
MESSAGE: Nonvolatile memory update on reader succeeded	
MESSAGE: Bootloader is in Network Mode	
MESSAGE: Dem Address 0XA4 = 0X00 (C3466IN1)	
MESSAUE. Hease press close button to milan.	-

18. Quit RFID FwUpgrade.

19. Open CSL C# Native Demo App. The updated firmware version can be checked.



11 Regulatory Information

11.1 Federal Communications Commission (FCC) Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter. This product must be installed by a professional technician/installer.

Appendix A. RFID Basics

Passive tag RFID technology involves the reader, the antenna and the tag.

The reader sends out energy in the relevant frequency band to the antenna via RF cables, and the antenna radiates the energy out. This energy impinges on an RFID tag.

The RFID tag consists of an antenna coupled to an RFID IC. This IC converts the AC voltage it receives at the antenna port to DC voltage that in turn is used to empower the digital circuit inside.

The digital circuit then turns on and off some components connected to the antenna port, thereby changing its scattering behavior, in a pre-designed clock rate.

This changing of antenna port parameters then causes a "modulation" of the back-scattered RF energy.

This modulated back-scattered energy is detected by the reader and the modulation is captured and analyzed.

Appendix B. Operation Profiles and Gen2 Parameters

<u>Link Profile</u>

Different modulation profile can be selected by the user for different situation. In CS468-3 (Japan) and CS468-1 (ETSI) readers, only profiles 0, 2, 3 and 5 are selectable. The default setting is profile 2. It is also the recommended setting for most of the common applications.

Profile	0	1	2	3	4	5
R-T Modulation	DSB-ASK	DSB-ASK	PR-ASK	PR-ASK	DSB-ASK	PR-ASK
Tari (µs)	25.00	12.50	25.00	25.00	6.25	25.00
R-T speed (kbps)	40	80	40	40	160	40
PIE	2:1	2:1	1.5:1	1.5:1	1.5:1	1.5:1
Pulse Width (uS)	12.50	6.25	12.50	12.50	3.13	12.50
T-R LF (kbps)	40	160	250	300	400	250
T-R Modulation	FM0	Miller-2	Miller-4	Miller-4	FM0	Miller-2
Divide Ratio	8	8	64/3	64/3	8	64/3
T-R Data Rate	40	80	62.5	75	400	125
(kbps)						

Q-Value

Q-value is a parameter that a reader uses to regulate the probability of Tag response. A reader commands Tags in an inventory round to load a Q-bit random (pseudo-random) number into their slot counter; the reader may also command Tags to decrement their slot counter. Tags reply when the value in their slot counter (i.e. their slot) is zero. Q is an integer in the range (0, 15); the corresponding Tag-response probabilities range from $2^0 = 1$ to $2^{-15} = 0.000031$.

It is usually recommended to set a Q-value that have the corresponding number of slots larger than the exact maximum number of Tags to be read by the reader. For example, if there are 40 tags to be read by the reader, the Q-value is configured to 6, in which $2^{Q} = 2^{6} = 64 > 40$.

In CS468, it consists of four main inventory algorithm (one fixed Q and three variable Q). The variable Q algorithms differ in their mechanism for adjusting the Q values at the end of each round. It also provides routines for the four tag access functions (read, write, kill and lock).

8) Fixed Q (Generic) Algorithm

- Fixed Q value
- Basis for all inventory algorithms.
- Optionally executes rounds until no tags are read.
- Optionally retries a rounds "n" times.
- Optionally flips A/B flag at end of round

This algorithm runs all inventory rounds with a single Q value. In this algorithm an inventory cycle consists of one or more rounds, each of which will attempt to read every slot. The number of slots to search is given by 2Q. For example, a Q of 7 will cause the algorithm to search 128 slots on each round. One word of caution, if the time it takes to run the round is greater that the frequency hop time (and the session is 0) or antenna dwell time, the round will never complete.

- 9) Dynamic Q Algorithm (1)
- Q adjusts up or down at the end of each round.
- Executes repeated rounds until no tags are read when Q = Q minimum.
- Uses Qstart,Qmax and Qmin parameters to control the range of Q.
- MaxReps to limit time spent at each Q value.
- HighThres and LowThres to control how Q will adjust.

In algorithm 1, the value of Q is dynamically adjusted based on the periodic evaluation of the relative frequency of RN16 timeouts vs EPC timeouts.

Each round is comprised of a Query and up to MaxReps queryReps.

The value of Q for the subsequent round is determined by the results of the current round. If the number of RN16 timeouts is greater than the number of EPC timeouts multiplied by thresHi, Q is decremented (presumed empty slots outnumber presumed collisions). If the number of RN16 timeouts is less than the number of EPC time outs times thresLo, Q is incremented (presumed collisions outnumber presumed empty slots). If the number of RN16 time outs falls between those two values, Q remains unchanged.

An inventory cycle is comprised of one or more inventory rounds, and is terminated when a round is executed with Q = 0 and no tags read.

10) Dynamic Q Algorithm (2) - Dynamic Q Adjust

- Almost identical to algorithm 1.
- Same control interface as algorithm 1.
- Uses QueryAdjust command to modify Q value

Algorithm 2 is identical to algorithm 1 with the sole exception that a queryAdjust command is used to adjust the value of Q rather than a query command.

Read rate performance is increased relative to algorithm 1 because a) the query Adjust command is shorter, and b) new rounds are not initiated each time the value of Q changes, reducing the frequency of duplicate tag reads in the course of an inventory cycle.

Note though that algorithm 1 may deliver superior performance when reading small fast moving (or changing) tag populations due to the increased frequency with which query Commands are issued.

11) Dynamic Q Algorithm (3) – Dynamic Q Thresh

- New Q adjustment algorithm.
- Uses Qstart,Qmax and Qmin parameters to control the range of Q.
- QueryReps are not limited to a maximum number on a round.
- Single threshold multiplier used to control Q adjustment.
- QueryAdjust command used to modify Q value as in Algorithm 2.

In algorithm 3, the value of Q is adjusted based on the continuous evaluation of the relative frequency of RN16 timeouts vs EPC timeouts.

An inventory cycle consists of a single round initiated by a Query command.

Following the query command, up to $((2^{A}Q)-1)$ queryRep commands are issued.

If in the course of operation the number RN16 timeouts exceeds the adjusted number of EPC timeouts by a calculated threshold, the value of Q is decremented (presumed empty slots outnumber presumed collisions). If the adjusted number of EPC timeouts exceeds the number of RN16 timeouts by a calculated threshold, the value of Q is incremented (presumed collisions outnumber presumed empty slots). While the relative number of RN16 time outs vs the adjusted number of EPC time outs falls within the threshold, Q is unchanged.

When the value of Q changes, or if all slots under the current Q value have been inventoried, the slot counters of the participating tag population is refreshed using a queryAdjust command. The calculated threshold equals the current value of Q times a multiplier (set by default to 1).

The EPC timeout count is adjusted by Rtot, the ratio of (EPC timeout / RN16 timeout).

An inventory cycle is terminated when all slots have been checked with Q = Qmin and no tags have been read.

Read rate performance is increased relative to algorithm 2 because a) Q remains unchanged while well matched to the population, b) Q value is changed more quickly when it is not well matched, and c) on the average, fewer queryAdjust commands are issued.

Session

An inventory process comprising a reader and an associated Tag population. A reader chooses one of four sessions and inventories Tags within that session. The reader and associated Tag population operate in one and only one session for the duration of an inventory round. For each session, Tags maintain a corresponding inventoried flag. Sessions allow Tags to keep track of their inventoried status separately for each of four possible time-interleaved inventory processes, using an independent inventoried flag for each process.

Inventories flag (Flag)

A flag that indicates whether a Tag may respond to a reader. Tags maintain a separate inventoried flag for each of four sessions; each flag has symmetric A and B values. Within any given session, reader typically inventory Tags from A to B followed by a re-inventory of Tags from B back to A (or vice versa).

Appendix C. RF channels

Region	Frequency Range	# of	Channels (MHz)
	(MHz)	channels	
Australia (AU)	920 - 926	10	920.75, 921.25, 921.75, 922.25, 922.75,
			923. 25, 923. 75, 924. 25, 924. 75, 925. 25,
Brazil 1 (BR1)	915 - 928	24	915.75, 916.25, 916.75, 917.25, 917.75,
			918.25, 918.75, 919.25, 919.75, 920.25,
			920.75, 921.25, 921.75, 922.25, 922.75,
			923. 25, 923. 75, 924. 25,
			924. 75, 925. 25, 925. 75, 926. 25, 926. 75,
			927. 25,
Brazil 2 (BR2)	902 - 907	33	902. 75, 903. 25, 903. 75, 904. 25, 904. 75,
	915 - 928		905. 25, 905. 75, 906. 25, 906. 75, 915. 75,
			916. 25, 916. 75, 917. 25, 917. 75, 918. 25,
			918.75, 919.25, 919.75, 920.25, 920.75,
			921.25, 921.75, 922.25, 922.75, 923.25,
			923. 75, 924. 25, 924. 75, 925. 25, 925. 75,
			926.25, 926.75, 927.25,
China (CN)	920 - 925	10	920. 625, 920. 875, 921. 125, 921. 375,
			921.625, 921.875, 922.125, 922.375,
			922. 625, 922. 875, 923. 125, 923. 375,
			923. 625, 923. 875, 924. 125, 924. 375,
ETSI, G800	865 - 868	4	865.70, 866.30, 866.90, 867.50,
Hong Kong (HK)	920 - 925	8	920. 75, 921. 25, 921. 75, 922. 25, 922. 75,
Singapore (SG)			923.25, 923.75, 924.25,
India (IN)	865 - 868	3	865.70, 866.30, 866.90,
Japan (JP)	952 - 954	7	952.40, 952.60, 952.80, 953.00, 953.20,
			953.40, 953.60,
Korea (KR)	910 - 914	19	910. 20, 910. 40, 910. 60, 910. 80, 911. 00,
			911.20, 911.40, 911.60, 911.80, 912.00,
			912. 20, 912. 40, 912. 60, 912. 80, 913. 00,
			913.20, 913.40, 913.60, 913.80,
Malaysia (MY)	919 – 924	8	919.75, 920.25, 920.75, 921.25, 921.75,
			922. 25, 922. 75, 923. 25,
South Africa (ZA)	915 - 919	16	915.7, 915.9, 916.1, 916.3, 916.5, 916.7,
			916.9, 917.1, 917.3, 917.5, 917.7, 917.9,

			918.1, 918.3, 918.5, 918.7,
Taiwan (TW)	922 - 928	12	922. 25, 922. 75, 923. 25, 923. 75, 924. 25,
			924. 75, 925. 25, 925. 75, 926. 25, 926. 75,
			927.25, 927.75,
USA (FCC)	902 - 928	50	902.75, 903.25, 903.75, 904.25, 904.75,
			905. 25, 905. 75, 906. 25, 906. 75, 907. 25,
			907. 75, 908. 25, 908. 75, 909. 25, 909. 75,
			910. 25, 910. 75, 911. 25, 911. 75, 912. 25,
			912. 75, 913. 25, 913. 75, 914. 25, 914. 75,
			915. 25, 915. 75, 916. 25, 916. 75, 917. 25,
			917. 75, 918. 25, 918. 75, 919. 25, 919. 75,
			920. 25, 920. 75, 921. 25, 921. 75, 922. 25,
			922. 75, 923. 25, 923. 75, 924. 25, 924. 75,
			925. 25, 925. 75, 926. 25, 926. 75, 927. 25

Appendix D. Common Mistakes

- 1. The CS468 comes ex-factory with a standard IP address (192.168.25.203). When the user first opens the unit from the box, the user must use a laptop with an IP address in the same subnet (192.168.25.x) to connect to the CS468. The user can also use the DEMO APP program to search for the CS468 and figure out its IP address. Once connected, then the user can change the IP address on the CS468. Once that is done, the CS468 can be deployed in the actual site.
- 2. If you need to connect the CS468 to a router/switch and use the Power-over-Ethernet (PoE) function of CS468, make sure that the router/switch you use is PoE-enabled.
- 3. When you use the CS468 Demo Application Program, make sure that the port number TCP 1515, 1516 and UDP 3040, 3041 are opened (or turn off any firewall on the network). These ports are used for the auto-discovery of the readers in the network.

Appendix E. Technical Support

System integrators setting up the CSL CS468 16-Port Reader may encounter some problems. To quickly solve that, they are welcome to send the symptoms and configuration files back to techsupport@convergence.com.hk for support. Please send the following:

- 1) CS468 Factory Serial Number best to take a photo of the label at the back of the reader and send the photo to CSL technical support team
- 2) Final firmware versions of reader
- 3) Final library version on PC side
- 4) Brief description of problems
- 5) Screen capture of problems or error messages on PC with time
- 6) Screen capture of command window doing "netstat -na" command
- 7) Screen capture of command window doing "ipconfig" command
- 8) Screen capture of Windows Task Manager "Processes" window
- 9) Screen capture of Windows Task Manager "Applications" window
- 10) Screen capture of Windows Task Manager "Performance" window
- 11) Photos of the overall site (if that can be released)

Send the above sets of data to techsupport@convergence.com.hk