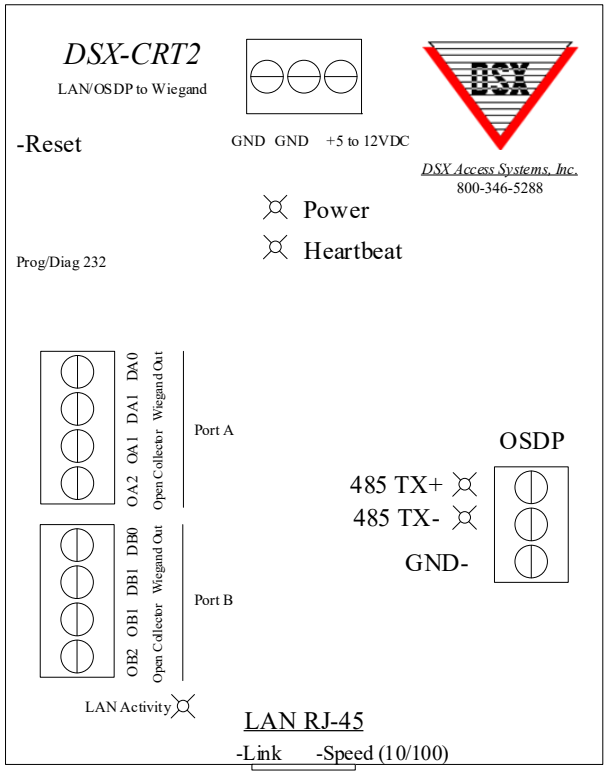
CRT 2 / CRT 4
Card Read Translator

Overview

The DSX-CRT can receive a concise and secure packet over the customers network and translate it to a Wiegand card read or a pulsed output. The CRT is a gateway for other systems such as Visitor Management, Facial Recognition, Temp and Mask Verification, Parking, or other applications to send a Card Read, Access Request or even an Alarm to the access control system.



The Card Read Translator Module is available as:
DSX-CRT2 which has 2-Reader Ports and 4-Outputs
DSX-CRT4 which has 4-Reader Ports and 8-Outputs

The Reader Ports operate with any Access Control Panel that accepts Wiegand (OSDP-Future). A Web Interface is used for programming to configure the Wiegand Output Format to 26, 33, 35, 37, 40, or 48-bits.

Open Collector Outputs also utilize the Web Interface for configuration. These Outputs can be connected to Controller Inputs for a variety of actions including:

Alarm Activations	Initiate Linking
Emergency Lockdowns	Emergency Unlocks
Request to Exit	Linking between Locations

Example: Covid/Temp Screening System

- Employee has their identity confirmed by their Card Read or Facial Recognition device.
- If they have a fever, a Command is sent to the CRT to activate an open collector output to signal a “fever alarm” or a different output for a “no mask” alarm.
- If the person is screened and validated, their card number can be sent to the CRT which translates it to a card read and can send it to the reader port of a Controller. The Controller could respond by Unlocking a Door or Checking the Card Holder In to enable their card throughout the rest of the Location.

Specifications

Size/Weight: CRT-2 = 4 3/4x3 ½, 8 oz. CRT-4 = 6 3/4x3 ½, 13.5 oz.

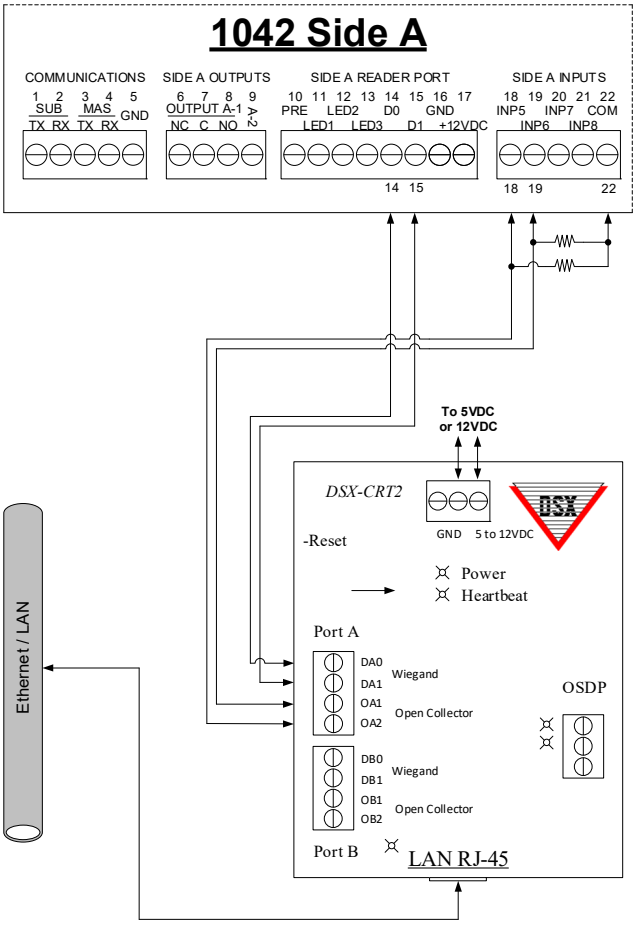
Power Requirements 5VDC from 1022 Controller or 5VDC from 1040-CDM
Do Not Power from 12V Output of 1040-CDM.

Software Requirements 5.0.33 or 6.0.33 and higher

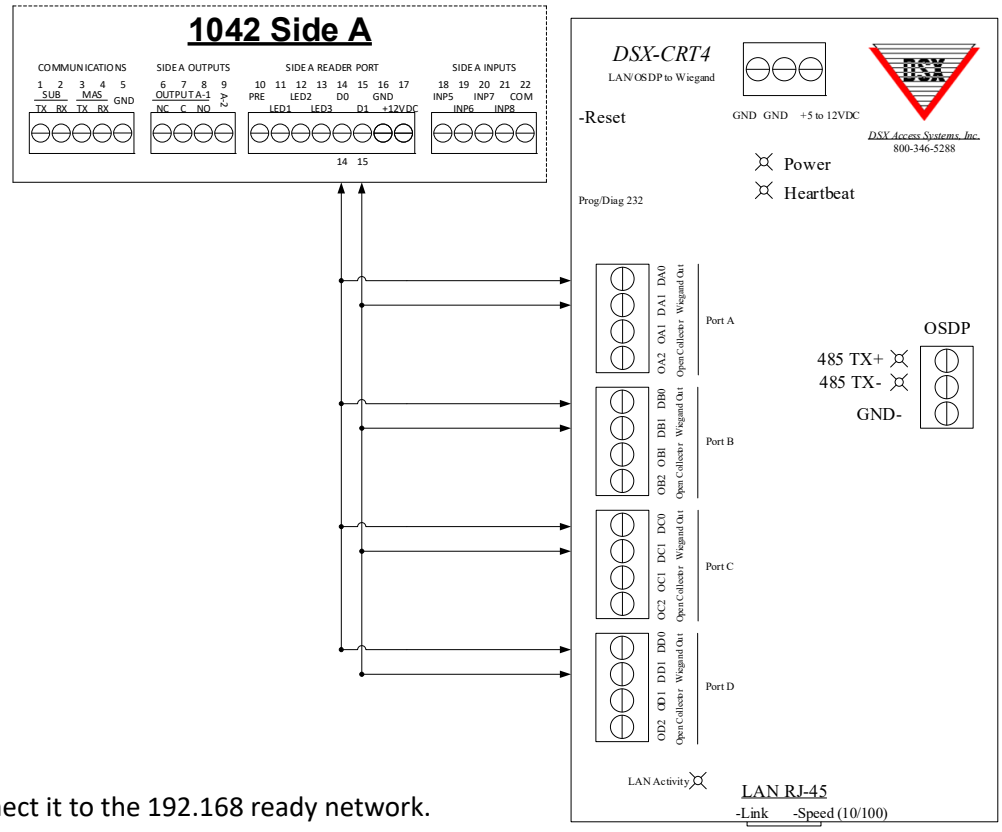
Outputs - 4 Wiegand Ports / 8 Open Collector 100ma Outputs

DSX-CRT to DSX-1042

This drawing shows how the DSX-CRT is connected to a DSX-1042 reader port. Power is connected to 5Volt reader power. The Outputs (Open Collector) are connected to DSX Inputs using the 1K resistor that came with the DSX-1042 Controller.



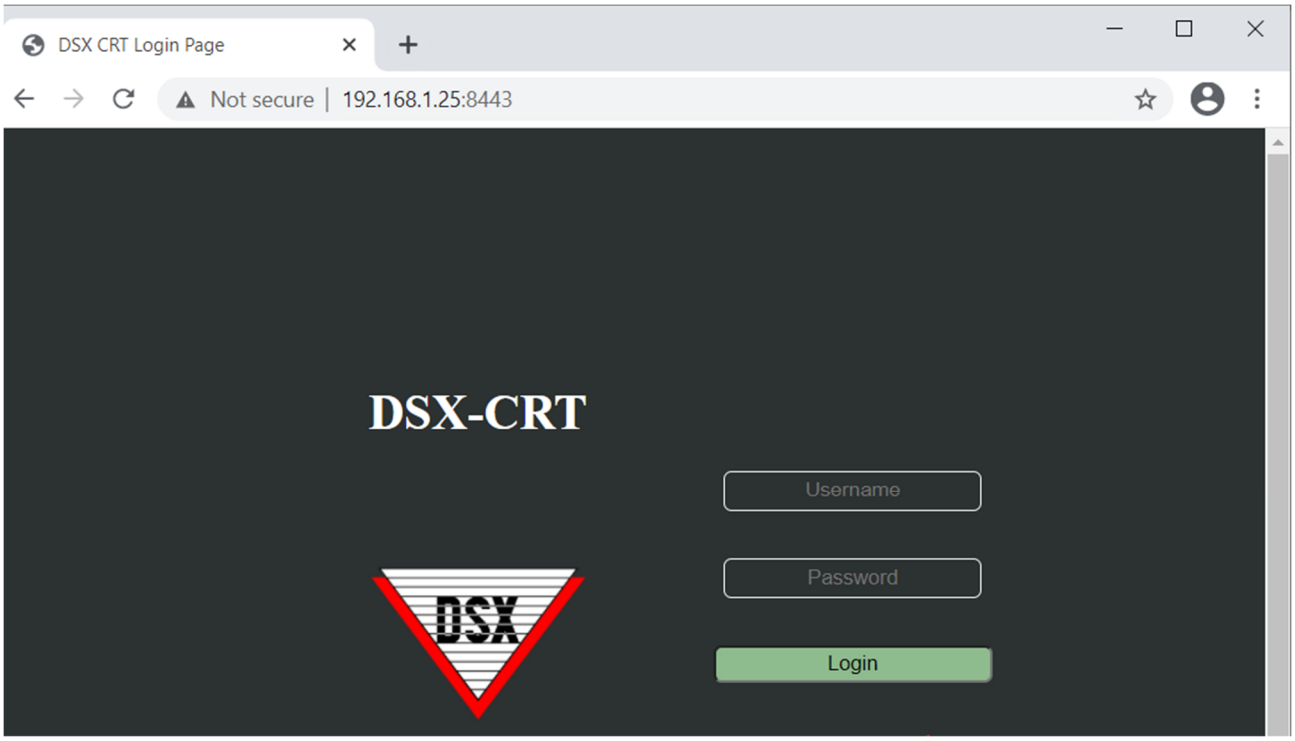
This drawing shows how to parallel connect more than one DSX-CRT port to one DSX-1042 Reader Port.



Login

Power the module up and connect it to the 192.168 ready network.

The default IP Address and port number is 192.168.1.25:8443
Enter Username - master Password - master and Click on Login.
(must click on Login, cannot press Enter)

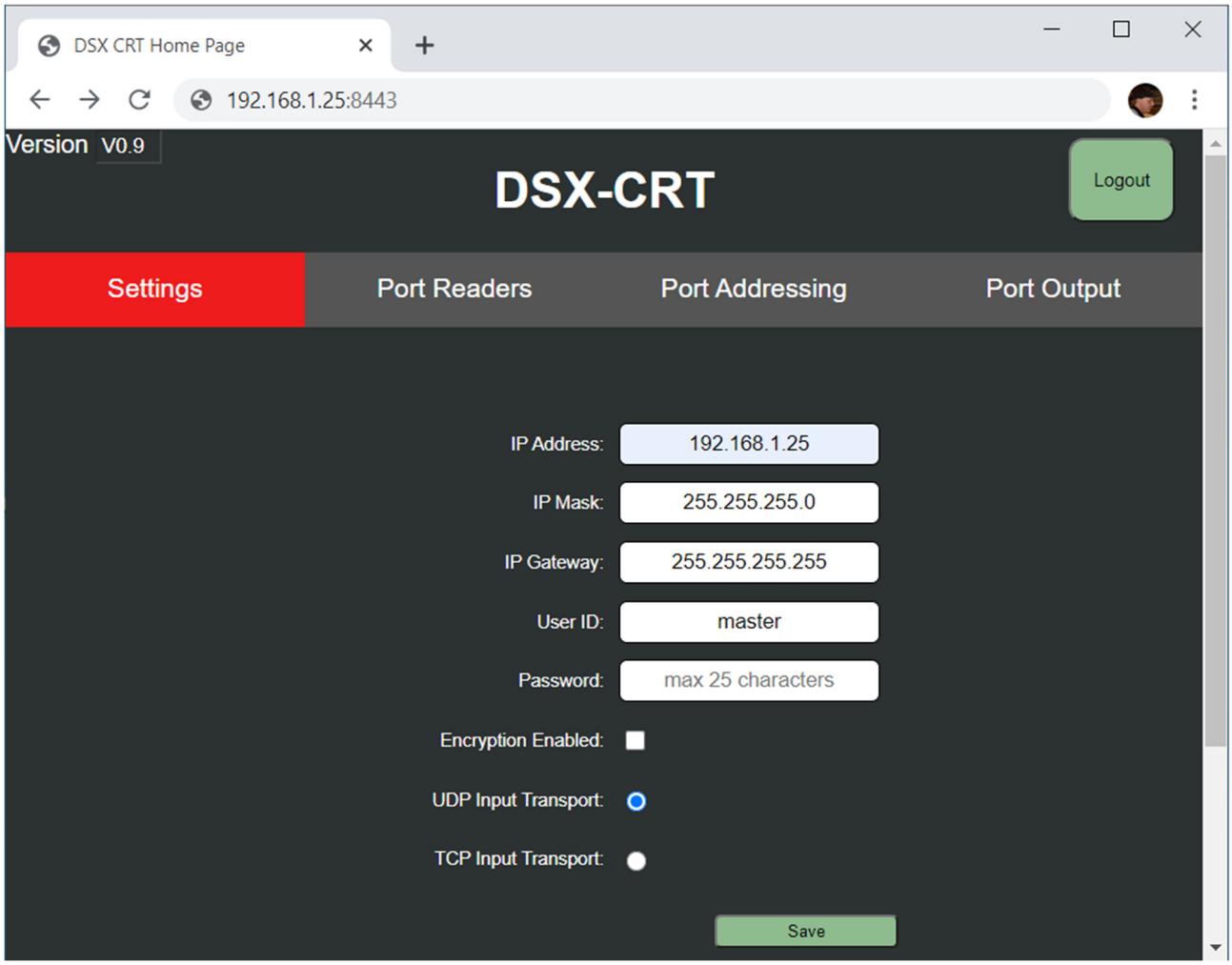


Settings

Settings page contains the modules IP addressing as well as login credentials and encryption selections. Encryption key is entered from the update program over the serial port so that the web server does not have access to it (hacking the webpage will not reveal the encryption key). Encryption is executed on the card reader packets but not the webpage or output control packets. There is a Logout Button and a Save Button on each screen.

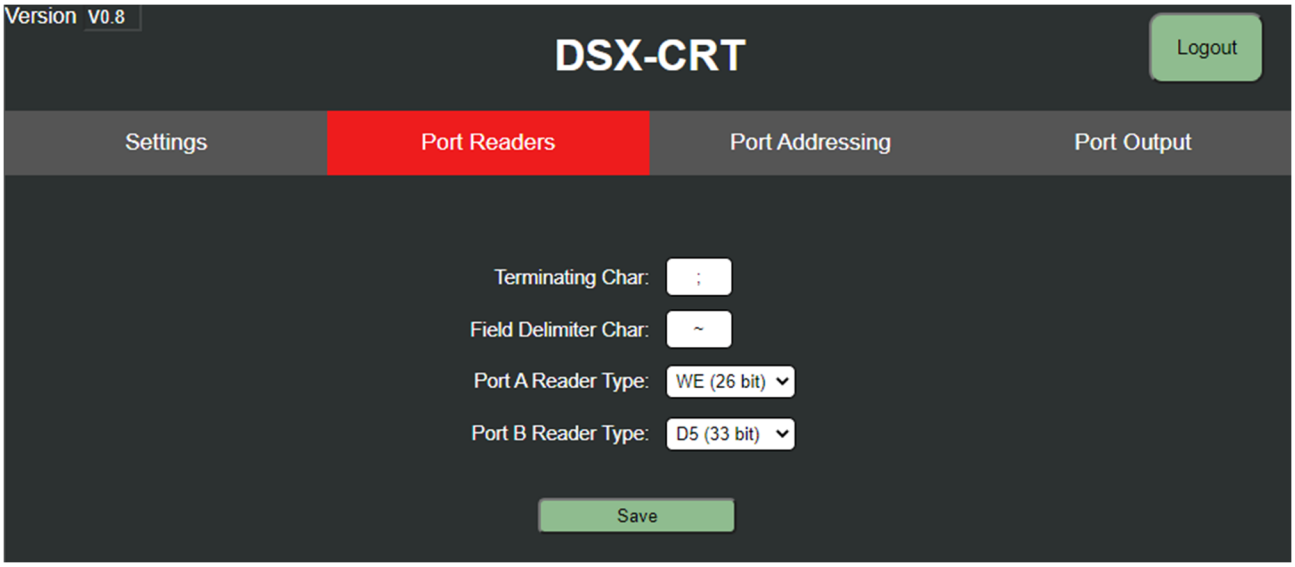
- Enter the New IP Address and Network Settings for the Module.
- Select the protocol that the module will receive TCP or UDP.
- After changing these settings power the unit down and back up.

Important: Once the IP Address and Network Settings are changed, Power the unit down and back up.



Port Readers - Reader Output Formatting

The Port Readers page contains formatting choices for the Reader UDP packets to be received and the Weigand output format for the 2 to 4 ports. The Terminating Character is used to delimit messages as Reader messages may not span UDP packets. The Field Delimiter Character is to separate the facility code and the card number. Each port can have a format assigned. Each Bit Format also shows the DSX Device type that would match that bit format.



Terminating Character: Enter the Character you want to terminate or end each message. All Card Read Messages should end with this character.
The Default is ;

Field Delimiter: Enter the Character that will separate the Facility Code and the Card Number.
The Default is ~

Port Reader Type: Set the Card Read Bit Format for Each Port used. WE=26, D5=33, K0=35, L5=37, T8=40, X0=48
Ports C and D are on the CRT-4 Four Port unit only.

Card Read Bit Formats and Card Read Strings

Device Type	Number of Bits	Card Format	Example
WE	26	FFF~CCCCC;	123~12345;
D5	33	FFF~CCCCCCCC;	123~12345678;
K0	35	FFFF~CCCCCCC;	1234~1234567;
L5	37	~CCCCCCCCCCC;	~12345678901;
T8	40	FFF~CCCCCCCCC;	123~123456789;
X0	48	FFFFFF~CCCCCCC;	123456~1234567;

Port Addressing

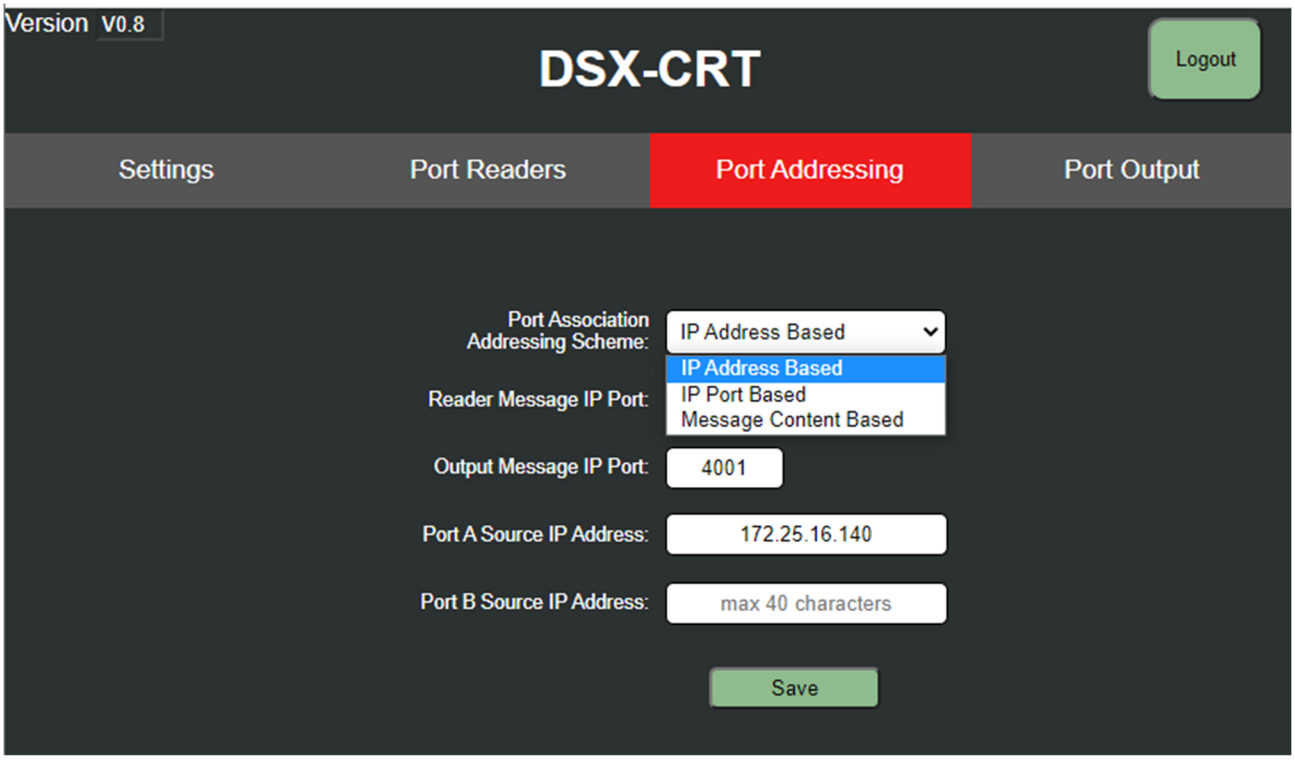
Decides how messages are going to be sent to the CRT and how the communication is secured. Each option is discussed in detail on the following pages.

Port Association Addressing Scheme:

- **IP Address Based**: Allows each reader port and associated outputs to be tied to a source IP Address. This would be used if one system was driving Port A while a different system is driving Port B.

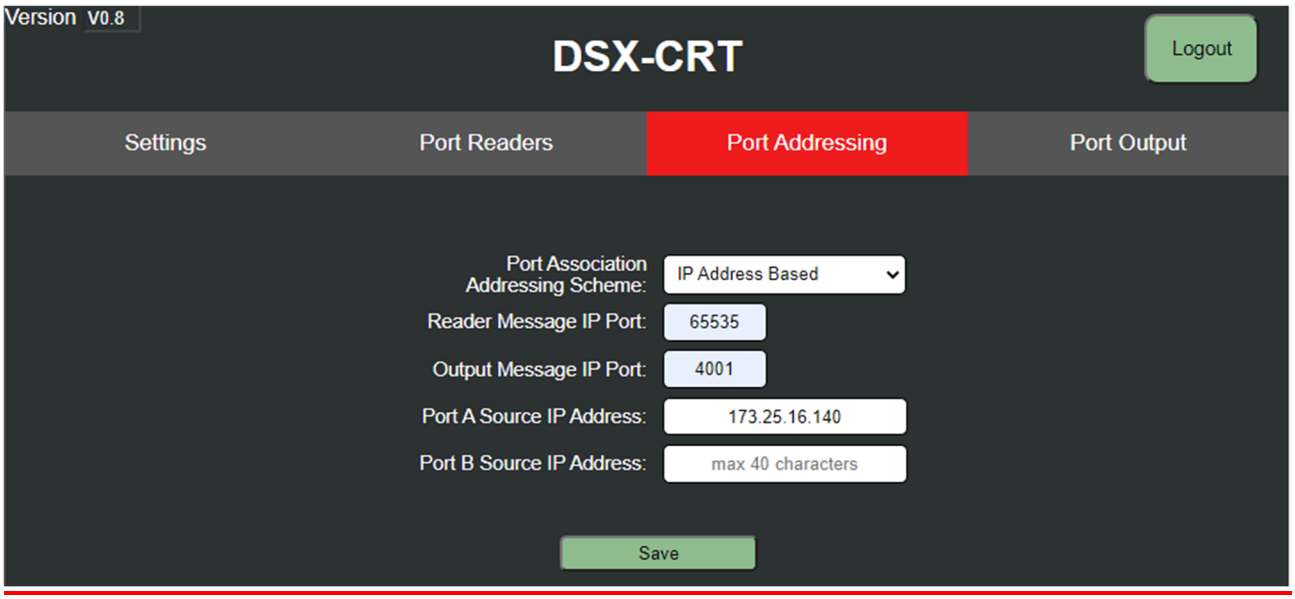
- **IP Port Based**: All messages would come to the same IP Address but to different Ports for each Reader Port and Output.

- **Message Content Based**: Sets the IP Port for all Reader Messages and for all Output Messages. The Message sent must Match the Message Stored for it to be sent out the correct Port or activate the correct Output.



Port Addressing – Source IP Address Based

The Reader (Port) Addressing page contains the configuration to associate the messages (both reader and output control) to their source device's address.



Messages from these addresses will be used to control the reader and/or outputs on the Ports A-D.

1. Select IP Address Based for the Port Association Addressing Scheme.
2. If Port A and Port B are controlled by different systems, each Port would require a different Source IP Address.
3. Specify the IP Port for Reader messages and the IP Port for the Output messages.
4. Specify the IP Address of the Source for each reader port.

IP Addressed Based – Reader Port Messages

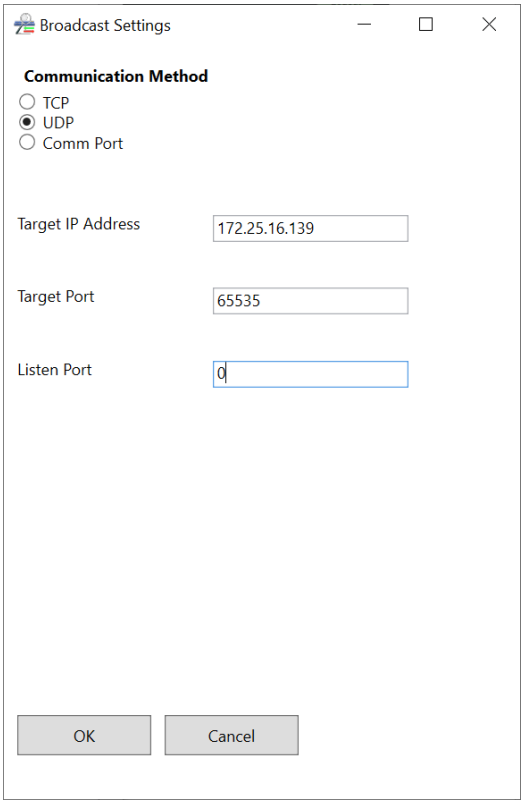
Example Message:
Reader Port A
To CRT: 173.25.16.139 IP Port 65535 **From:** 173.25.16.140 IP message for Port A
Port A was set for WE-26bit = 3digit facility code and a 5digit card number.
FFF~CCCCC; or 123~12345; for 26bit
FFF~CCCCCCCC; or 123~12345678; for 33bit

IP Addressed Based - Output Messages

Example Message:
Output A – 1, Output A – 2
To CRT: 173.25.16.139 IP Port 4001 **From:** 173.25.16.140 for Output A-1
1-1 Matches Output 1 string / String is User Defined configured under - **Port Output**
2-2 Matches Output 2 string / String is User Defined configured under - **Port Output**

Kb2c Reader Test Program Settings: IP Address Test

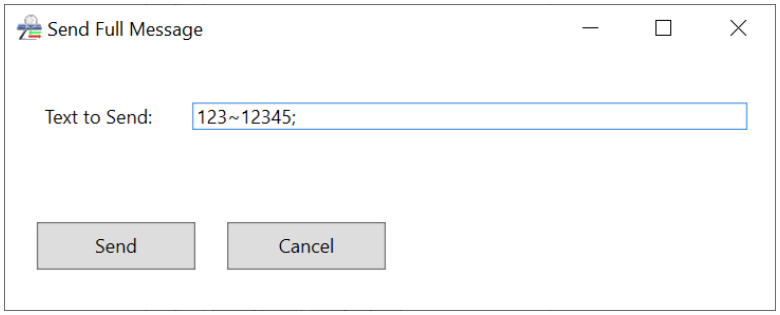
Under Target set the Method to UDP and the IP Address and Port number



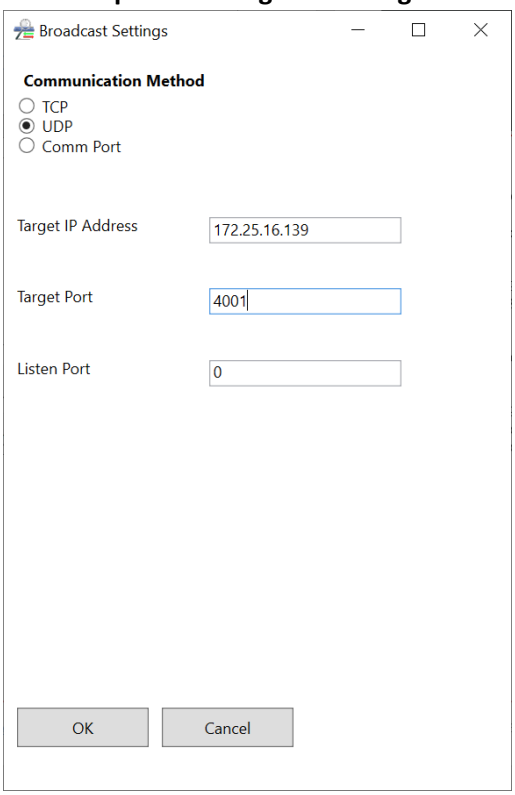
Under Options Select Send Full Message and enter the appropriate

Card format message and click Send.

For WE-26 Bit FFF~CCCCC; or 123~12345;
For D5-33 Bit FFF~CCCCCCCC; or 123~12345678;



Kb2c Output Test Program Settings: IP Address Test

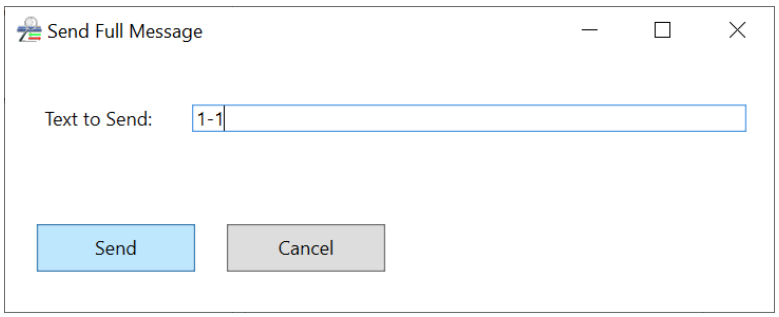


Under Options Select Send Full Message and enter the appropriate

Output message and click Send.

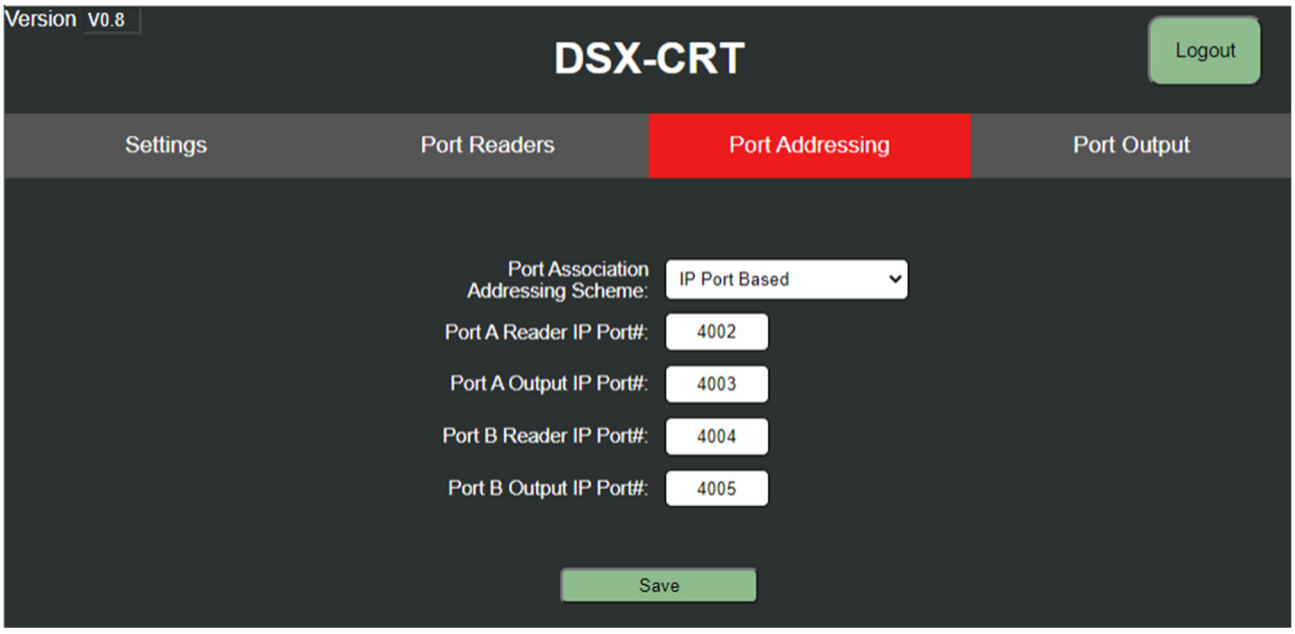
1-1

2-2



Port Addressing – IP Port Based

All messages would come to the IP Address of the CRT, but to different Ports for each Reader Port and Output.



Set the IP Port for Reader A and for Output A. Repeat for all available ports used.

IP Port Based – Reader Port Messages

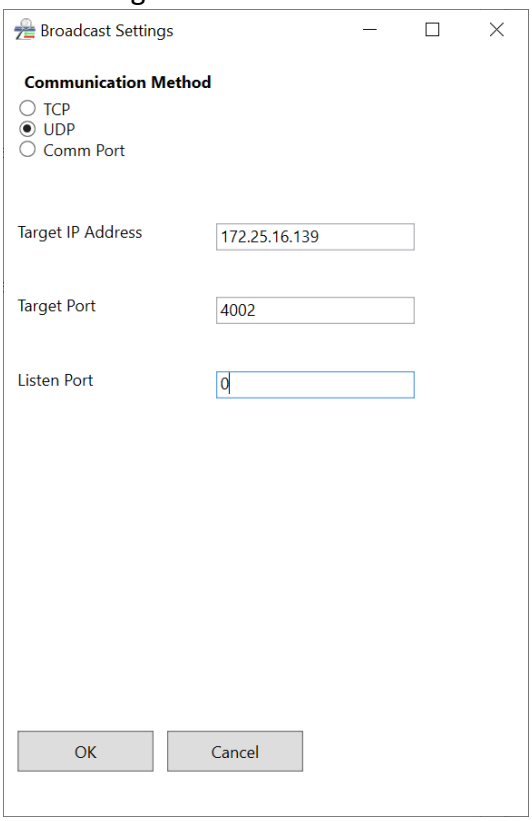
Example Message:
Reader Port A
To CRT: 173.25.16.139 IP Port 4002
FFF~CCCCC; or 123~12345; Port A was set for WE = 3-digit facility code and 5-digit card number

IP Port Based - Output Messages

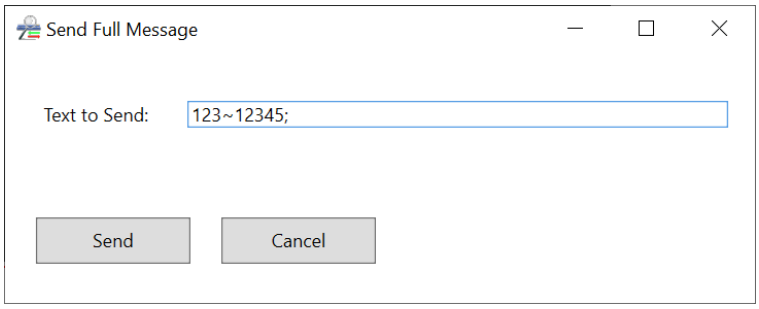
Example Message:
Output A – 1, A – 2
To CRT: 173.25.16.139 IP Port 4003
1-1 Matches Output 1 string / String is User Defined configured under **Port Output**
2-2 Matches Output 2 string / String is User Defined configured under **Port Output**

Kb2c Reader Test Program Settings: Port Addressing

Under Target set the Method to UDP and the IP Address and Port number



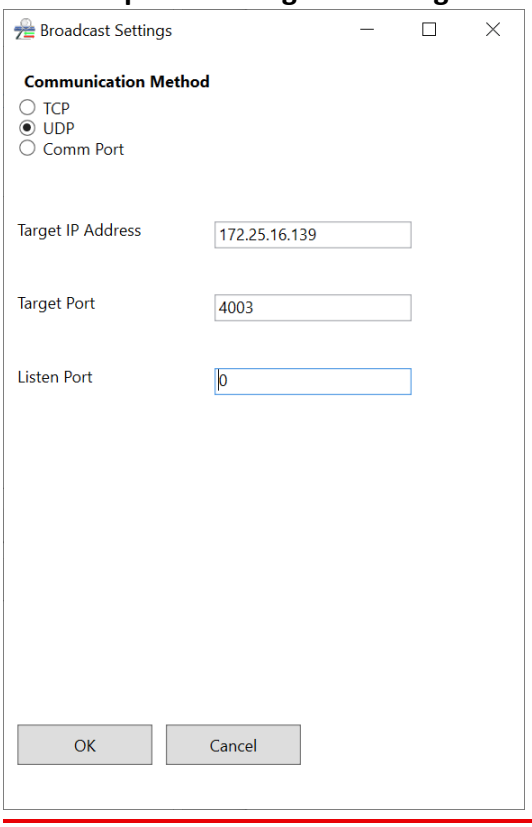
Under Options Select Send Full Message and enter the appropriate Card format message and click Send.

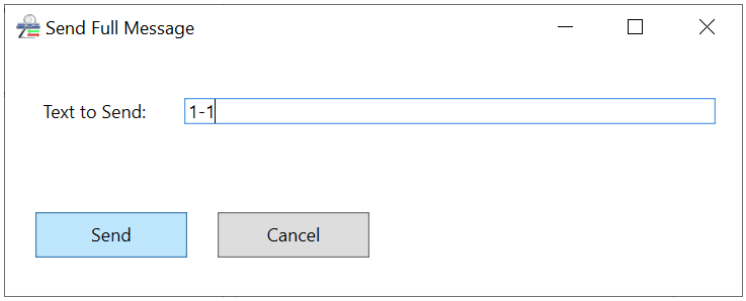


For WE-26 Bit FFF~CCCCC; or 123~12345;

For D5-33 Bit FFF~CCCCCCCC; or 123~12345678;

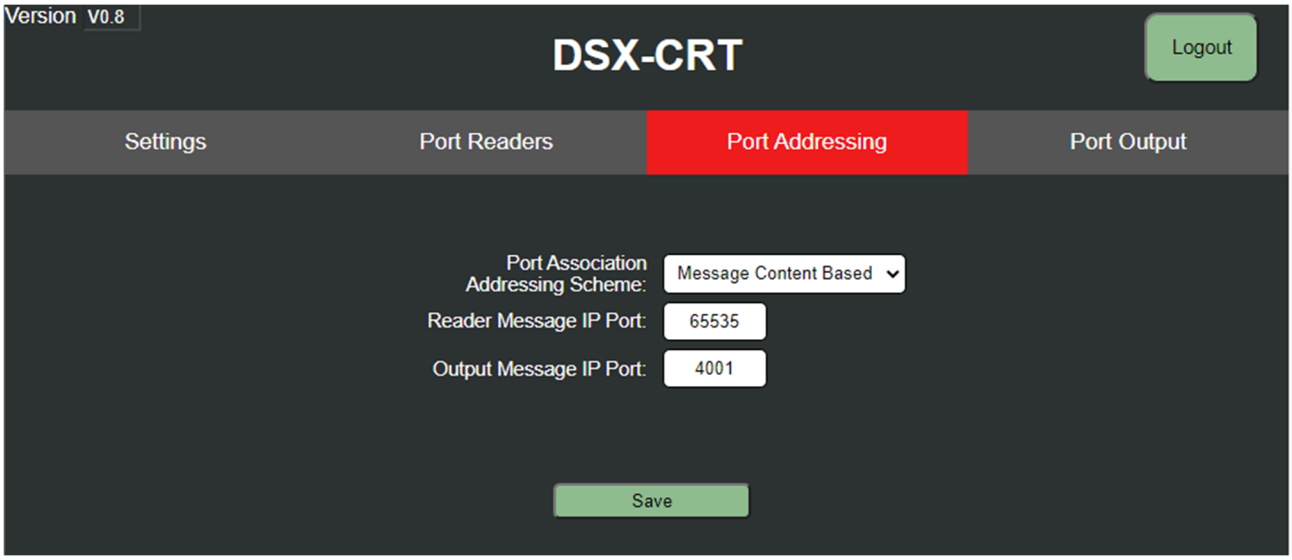
Kb2c Output Test Program Settings: Port Addressing





Port Addressing – Message Content Based

Sets the IP Port for all Reader Messages and for all Output Messages. The Message sent must Match the Message Stored for it to be sent out the correct Reader Port or activate the correct Output.



Set the Port Association Addressing Scheme - Message Content Based
Reader Message IP Port - Enter the IP Port that all Reader Messages will be sent to.
Output Message IP Port - Enter the IP Port that all Output Messages will be sent to.

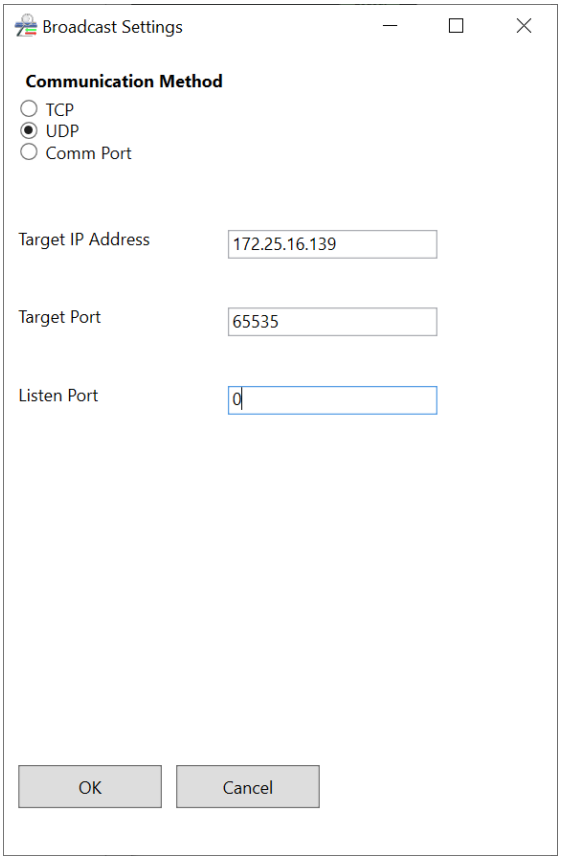
Message Content Based - Input Messages

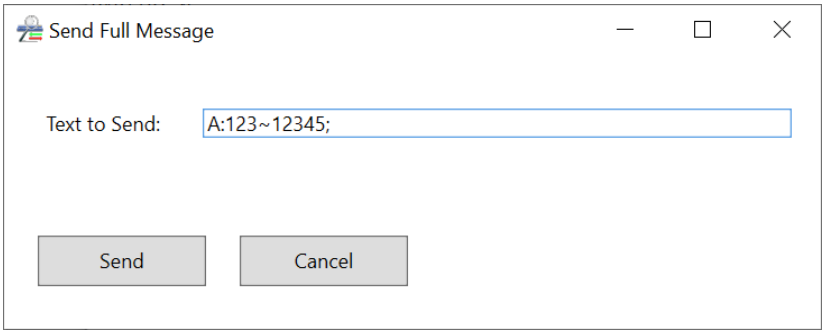
Example Message:
Reader Port A, B
To CRT: 173.25.16.139 IP Port 65535
A:FFF~CCCCC; or A:123~12345; Port A: WE-26Bits
B:FFF~CCCCCCCC; or B:123~12345678; Port B: D5-33Bits

Message Content Based - Output Messages

Example Message:
Output A – 1, A – 2
To CRT: 173.25.16.139 IP Port 4001
A:1-1 Matches Output 1 string / String is User Defined configured under **Port Output**
A:2-2 Matches Output 2 string / String is User Defined configured under **Port Output**

Kb2c Reader Test Program Settings: Message Content Based

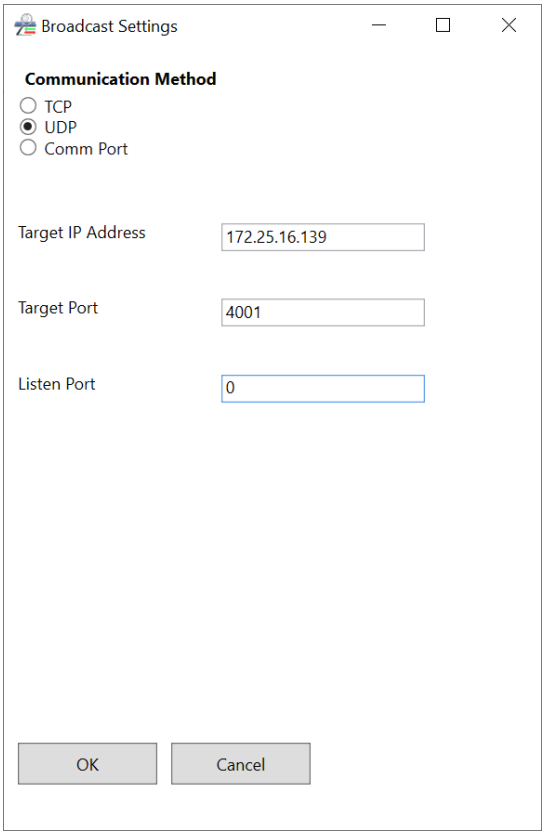


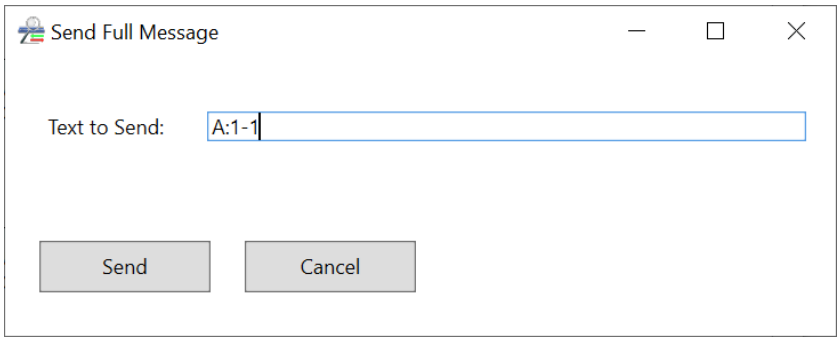


A: for Port A / B: for Port B

For WE-26 Bit on Port A A:FFF~CCCCC; or A:123~12345;
For D5-33 Bit on Port B B:FFF~CCCCCCCC; or B:123~12345678;

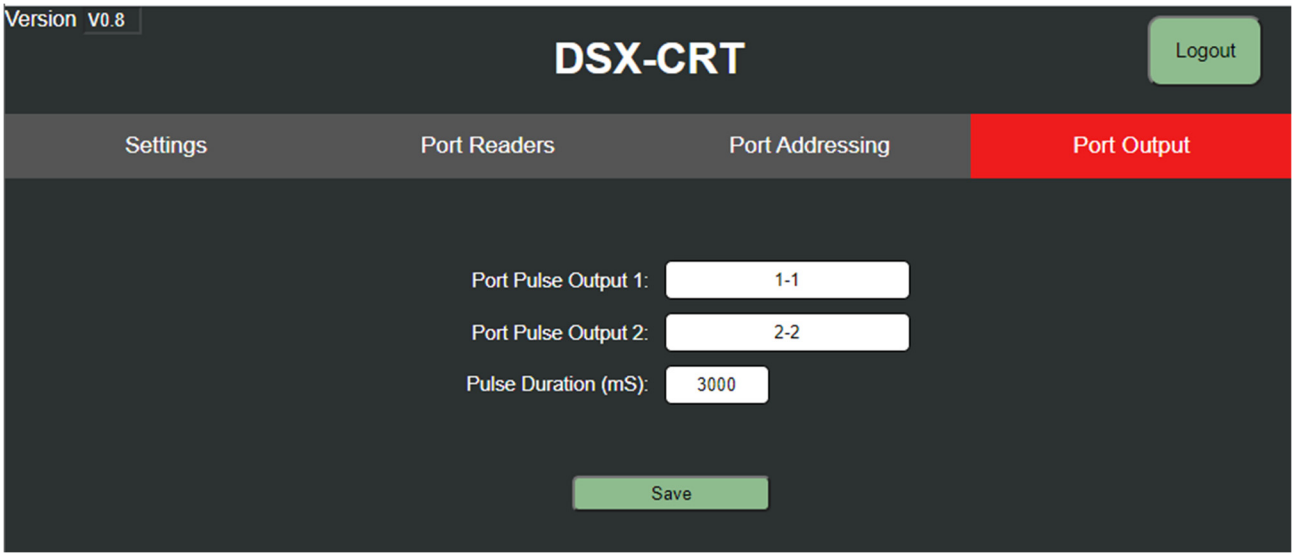
Kb2c Output Test Program Settings: Message Content Based





Port Output – Output Configuration

The Output Configuration page defines the commands for pulsing output 1 and 2 on each Port (A-D) and the time of duration for that pulse. The default duration is 3000 milliseconds. If an output is pulsed while it is in an active pulse, the pulse is restarted.



Port Pulse Output String 1. – Enter the User Defined string or command that must be sent from the other system to control this Output, up to 25 characters. User Defined 1-1

Port Pulse Output String 2. – Enter the User Defined string or command that must be sent from other system to control this Output, up to 25 characters. User Defined 2-2

Pulse Duration – Enter the amount of time in milliseconds the Outputs should pulse for.
3000=3 seconds.

Message Examples

Source IP Addressing Scheme

Reader Message
To CRT: 192.168.1.100 IP Port 65535 From: 192.168.1.200 for Port A Reader Port
FFF~CCCCC; or 123~12345; Port A was set for WE = 26 bits.

Output Message
To CRT: 192.168.1.100 IP Port 4001 From: 192.168.1.200 for Port A Output 1
1-1 Matches Output 1 string / String is User Defined

IP PORT Addressing Scheme

Reader Message
To CRT: 192.168.1.100 IP Port 4002 for Port A Reader Port
FFF~CCCCC; or 123~12345; Port A was set for WE = 26 bits.

Output Message
To CRT: 192.168.1.100 IP Port 4003 for Port A Output 1
1-1 Matches Output 1 string / String is User Defined

Message Content Addressing Scheme

Reader Message
To CRT: 192.168.1.100 IP Port 65535 for Port A Reader Port
A:FFF~CCCCC; or A:123~12345;

Output Message
To CRT: 192.168.1.100 IP Port 4001 for Port A Output 1
A:1-1 Matches Output 1 string / String is User Defined

Card Formats and Examples

Device Type	Number of Bits	Card Format	Example
WE	26	FFF~CCCCC;	123~12345;
D5	33	FFF~CCCCCCCC;	123~12345678;
K0	35	FFFF~CCCCCCC;	1234~1234567;
L5	37	~CCCCCCCCCCC;	~12345678901;
T8	40	FFF~CCCCCCCCC;	123~123456789;
X0	48	FFFFFF~CCCCCCC;	123456~1234567;

Location to Location Linking

The DSX-CRT can be used to link an alarm in one Location to an input in another Location.

1. An Alarm point (input) in one Location (Location A) can have an Action Message assigned that is sent out as a TCP message to the CRT module that is connected to an Input in the other Location (Location B).
2. When the input at Location A goes into alarm, or changes state, the comm server sends a TCP message to the CRT module and it in turn activates the appropriate output at Location B that sets the second input into alarm.

Note:

- The Comm Server has an ASCII TCP Port defined that contains the IP Address and Port number of the CRT module.
- There must be an Action Message created that contains the command string required to activate the desired output on the CRT module.

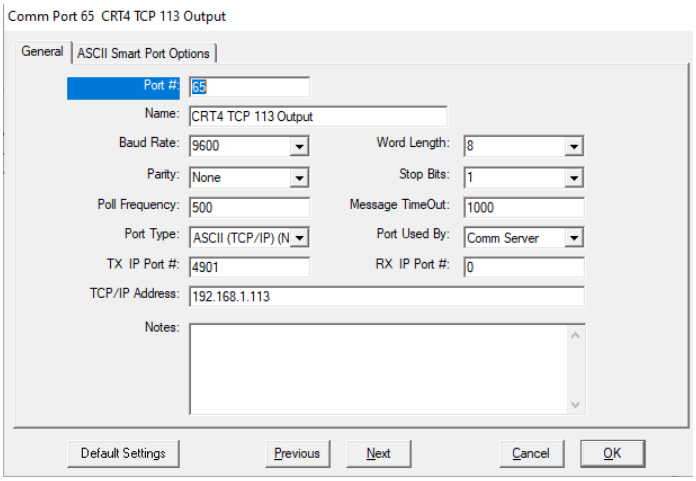


Figure 1 The Comm Port Server has ASCII TCP Port defined that contains the IP Address and Port Number of the CRT Module

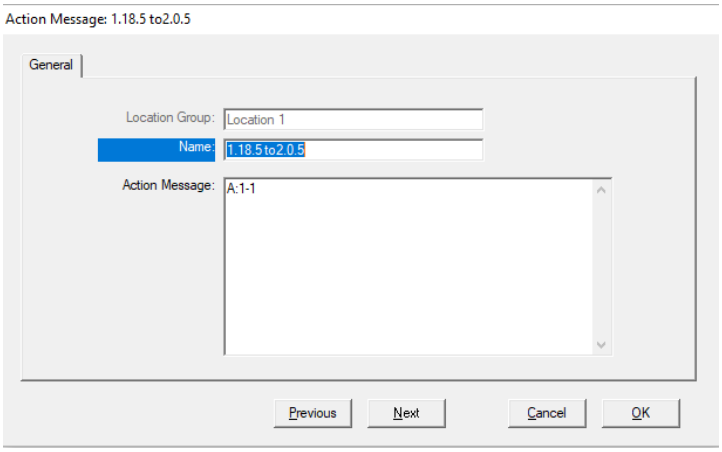


Figure 2 There must be an Action Message created that contains the command string required to activate the desired output on the CRT module at Location B

The Action Message and ASCII port are assigned to the originating input. When it is faulted or in alarm the Action Message command string is sent as a TCP message to the CRT module.
The CRT then activates the appropriate Output that physically faults an input in the second Location (Location B).

The input in Location B could cause a linking function to take place.

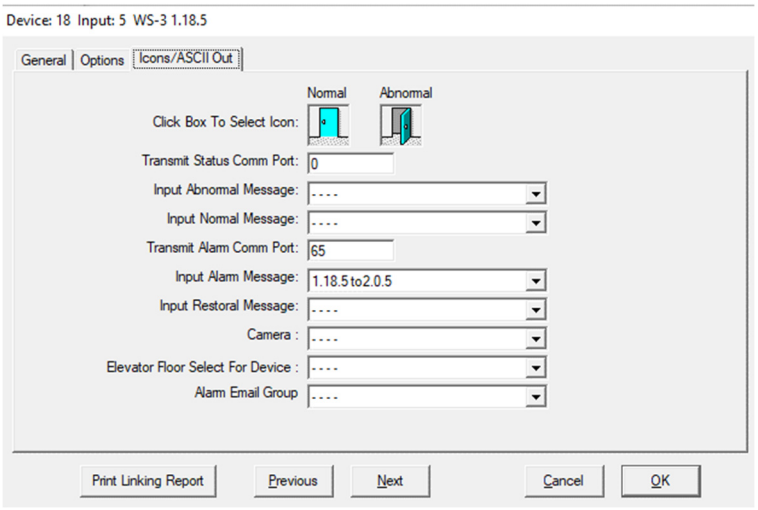


Figure 3 Assignment of ASCII Port

Updating the CRT / Enabling Encryption

Connect the DSX-CRT2 or DSX=CRT4 to the PC or laptop via the supplied serial port cable to:

Reset the Unit
Update the CRT internal Firmware
Enable the Reader Port Encryption

The CRT should be wired to a DSX-USB Serial adapter or other serial port according to the drawing below.
Copy the update program into the WinDSX folder and launch it.

Figure 1 Select Comm Port and click on Connect.

1. Select the Comm Port and click on Connect.

Figure 2 CRT shown as disconnected.

2. Remove Power and reconnect.
The program should show connected with the Device ID.

3. From here you can Factory Reset the device, Update the Firmware Version in the device, or Insert the Encryption Key.

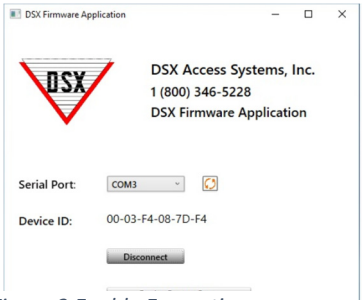
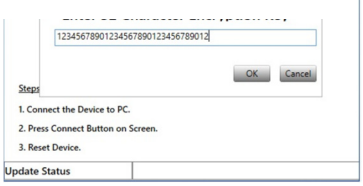
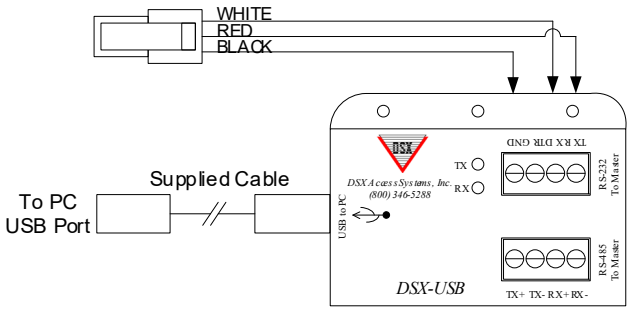


Figure 3 Enable Encryption



4. To enable encryption, click on Update Encryption Key and enter the 32 Character Key and Click OK. The Encryption is AES256 CBC with an initial vector of 0.



Turn Encryption On or Off

On the webpage, enter the first 4 characters of the encryption key to toggle Encryption on or off.
This keeps hackers from turning off encryption.

Time Stamps and Encryption

To prevent Card Read messages from being recorded and played back to the system, a Time Stamp can be added to the encrypted message. Timestamps are in the form of "seconds since Jan 1 1970" or Epoch time which is the accepted standard format for programming.

To Set the Time in the CRT

To set the time on the CRT:

Send a packet in the format of @xxxxxxxxxx where the x's represent the integer number timestamp.
If the time set packet is not sent before the first card reader packet is sent, the timestamp on the first card read packet will be used to set the time.

There is no enable/disable for Timestamps on the webpage.
When encryption is enabled, if an @ sign is detected, the CRT will assume timestamps are enabled.

Card Reads with Time Stamps

For subsequent packets:

Add a timestamp after the terminating delimiter of the card read in the same format of @xxxxxxxxxx.
(example 123~456789;@1622240605)
Do not use the character @ sign for a card read delimiter if using timestamps.
After the time is set, any packet with a timestamp that is older than 10 seconds from the current time will be discarded.

Time Changes / DST

Timestamps assume GMT with no Regional Time Zone and no Daylight Savings Time. The time the CRT was set, dictates the relative time. If the source time changes,

A new Time Set Packet must be sent to the CRT
OR
The CRT must be rebooted and the first packet with time will set the time.

CRT Time MUST match the Time on the source system to allow card read packets to pass.