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# FRONTLINE TEST SYSTEM™

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## SETUP AND QUICK START GUIDE

### CONTROLNET NETWORK ANALYSIS USING NETDECODER

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## Minimum System Requirements

- \* PC with Windows XP (Service Pack 2 or higher), Windows Vista (32 bit) or Windows 7 (32-bit/64-bit)
- \* Pentium 1 GHz processor or higher
- \* RAM Requirements: 1GB minimum, 2GB recommended
- \* 50 MB free Hard Disk Space (for the analyzer software)
- \* One USB 2.0 Port for the 1784-U2CN
- \* One PCMCIA Port for the 1784-PCC

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## Introduction

**Welcome** to Frontline Test System™ (FTS) *ControlNet Quick Start Guide*. We designed the online Help System with complete explanations and easy to use systematic instructions. Access the online Help by choosing Help Topics from the Help menu, or by pressing the F1 key on any window.

To access the PDF version of this Quick Start Guide from your Windows operating system, click *Start | Programs | NetDecoder [version#] | Setup | ControlNet QSG.*

## ControlNet Analysis Using Rockwell Automation's 1784-U2CN

The 1784-U2CN lets you connect a computer to a ControlNet network via an unused USB port on the computer.



**Figure 1 - 1784-U2CN**

In order to use the 1784-U2CN with NetDecoder, you need to perform the following steps:

1. Install the 1784-U2CN on your analysis PC
2. Shutdown RS-Linx completely before using NetDecoder
3. Configure Hardware Settings in NetDecoder
4. Configure I/O Settings in NetDecoder
5. Start data capture

This Quick Start Guide contains information on these steps.

### Install the 1784-U2CN on your analysis PC

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The first step is to install the 1784-U2CN to the PC where you will be doing the analysis.

Please follow the installation instructions provided by Rockwell Automation to install your 1784-U2CN. An instruction booklet is included in your 1784-U2CN shipping box.

The instructions are also available on Rockwell Automation's website:

[http://samplecode.rockwellautomation.com/idc/groups/literature/documents/in/1784-in047 - en-p.pdf](http://samplecode.rockwellautomation.com/idc/groups/literature/documents/in/1784-in047-en-p.pdf)

### Shutdown RS-Linx completely before running NetDecoder

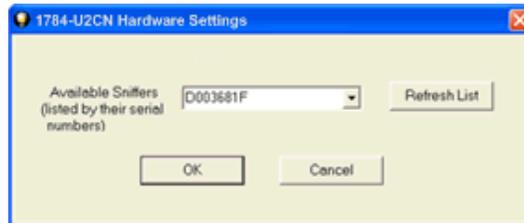
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To prevent port conflict, RS-Linx must be completely shut down before using the NetDecoder analyzer with the 1784-U2CN. It is not sufficient to simply close the RS-Linx window.

1. Right click on the RS-Linx icon on your system tray and select Shutdown RS-Linx.

## Configure Hardware Settings in NetDecoder

The Hardware Settings dialog allows you to select a device to sniff/scan. You access the Hardware Settings dialog by selecting **Hardware Settings** from the **Options menu** on the NetDecoder Control window.



**Figure 2 - Hardware Settings**

The NetDecoder software automatically scans and identifies all the 1784-U2CN devices plugged into the PC. These devices, identified by their Serial Numbers, are displayed in the drop-down list of Available Sniffers.

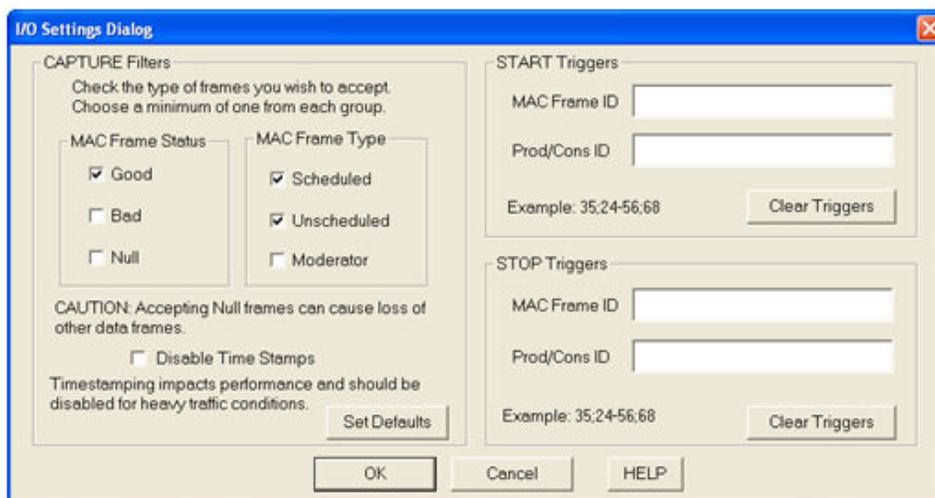
1. Select a device from the drop-down list
2. Select OK.

Selecting Cancel overrides all the selections and returns the user to the Control Window.

**Note: You can select Refresh List to update the list of devices.**

## Configure I/O Settings in NetDecoder

While using the 1784-U2CN, the I/O Settings Dialog provides the user options for setting **Capture Filters**, as well as **START** and **STOP** triggers.



**Figure 3 - I/O Settings Dialog**

## Capture Filters

You can choose to filter on ControlNet traffic based on the frame's Status or Type. The Frame Status options are:

- Good
- Bad = erroneous data
- Null = empty frames

There are three types of frames on the network:

- Scheduled traffic
- Unscheduled traffic
- Frames sent by the Moderator.
- To set a capture filter: You can select more than one from each group, but you must select at least **one MAC Frame Status** and **one MAC Frame Type**.
- The default setting for capture filters is **Good** for the Frame Status and **Scheduled** and **Unscheduled** for the Frame Type.

## Disable Time Stamps

You can also choose to disable timestamps. When you activate **Disable Time Stamps**, the values in the place holders for the timestamps are random and the Frame Display will show incorrect values for the timestamps. You should ignore those values if timestamping is disabled.

## START and STOP Triggers

A START trigger is defined as the event that starts data capture. The capture engine ignores all frames prior to the specified START trigger. All subsequent frames are captured until either a user-defined STOP trigger occurs or the user manually stops data capture.

A STOP trigger is defined as the event that stops data capture. The capture engine stops capturing all frames after the specified STOP trigger is reached.

- You can define the START and STOP triggers according to the contents of the Source and Destination MAC IDs in the ControlNet frame.
- START and STOP triggers are applied after filtering data.
- The triggers are defined on the MAC ID of the frame or on the Prod/Cons ID.
- You can enter multiple individual IDs separated by a semi-colon. For example: "35;12;56;2"
- You can also a range of values. e.g. "12-28"
- You can also enter a combination of individual values and ranges. e.g.: "12;34;56-70;15"

To learn more about Start and Stop Triggers see the section on Defining Start and Stop Triggers.

## Configure Hardware Settings in NetDecoder

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The Hardware Settings display provides the current status of the installed 1784-PCC card in the following fields:



**Figure 4 - Hardware Settings**

- Sniffer Hardware - Identifies the card currently installed. If this field is blank, then no card is installed.
- Memory Address - Identifies the dual-port memory address
- IRQ Number - Identifies the number of the protocol analyzer application
- Card Status - Indicates whether any application has "locked" the card
- Application Using the Card - If the card status is "Locked", then this indicates the application using the card.
- Firmware Version - Identifies the firmware version of the card

The 1784-PCC card is also used by other applications such as RSLinx. Only one application can have access to the 1784-PCC card at a time. When one of these applications is running, it locks the card and prevents other applications from accessing it.

## Configure I/O Settings in NetDecoder

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Use the I/O Settings  dialog to select a buffer size, set and apply start and stop times or triggers to the capture session, and apply any capture filters to the data on the network. Selections made in the I/O Settings dialog are persistent during the analyzer session, but revert to the defaults when the analyzer is shutdown and re-started. The default settings are 32MB buffer size, no start or stop triggers selected, and no filters selected. To Access the I/O Settings Dialog

1. Choose *I/O Settings* from the *Options* menu on the Control window.

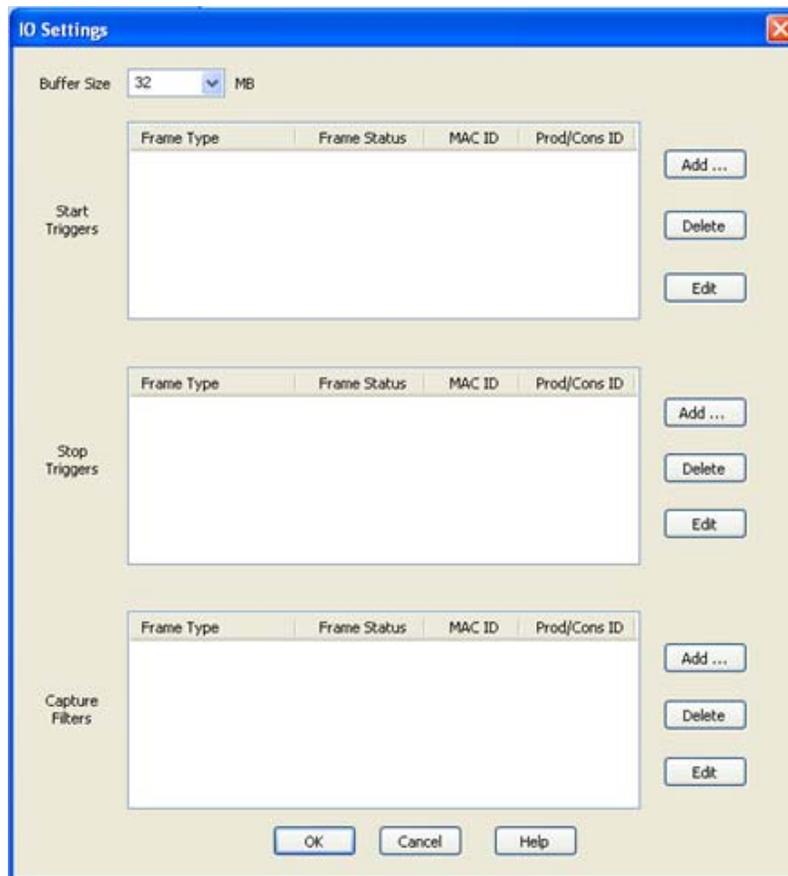


Figure 5 - I/O Settings

2. Select a buffer size from the *BUFFER SIZE* list, or accept the default value.
3. If you want the capture to begin and end based on triggers, then select the start and stop triggers in the *START TRIGGERS* and *STOP TRIGGERS* panes by checking the boxes to the left of the trigger definitions.
4. If the triggers you want to use are not in the list, then you must define them. See *Defining Start and Stop Triggers* in the next section
5. Select the filters you want to use in the *CAPTURE FILTERS* pane by checking the boxes to the left of the filter definitions.
6. If the filters you want to use are not in the list, then you must define them.
7. Click the *OK* button at the bottom of the *I/O Settings* dialog, and start the analyzer.

## Defining Start and Stop Triggers

### Triggers:

A START trigger is defined as the event that starts data capture. The capture engine ignores all frames prior to the specified START trigger. All subsequent frames are captured until either a user-defined STOP trigger occurs or the user manually stops data capture.

A STOP trigger is defined as the event that stops data capture. The capture engine stops capturing all frames after the specified STOP trigger is reached.

#### Start/Stop trigger on frame condition allow you to:

Define the Producer MAC ID(s) you want to trigger. You can define:

- a single Producer MAC ID (in a range 0-255).
- a group of IDs. Separate the range by a hyphen (2-88). The range can extended from 0 to 255.
- multiple IDs. Separate the IDs by a semi-colon (2;9;27).
- a group and multiple IDs (2-7;3;8).

If you do not enter a value in this field, the full range (0-255) becomes the default value.

Define the Producer MAC ID(s) you want to trigger in each LPacket.

- For a Generic LPacket, it is the Producer/Consumer ID.
- For a Fixed LPacket, it is the Destination ID.
- For a Broadcast ID, it is 255.

You can define:

- a single Producer/Consumer MAC ID (in a range 0-255).
- a group of IDs. Separate the range by a hyphen (2-88).

The range can extended from 0 to 255.

- multiple IDs. Separate the IDs by a semi-colon (2;9;27).
- a group and multiple IDs (2-7;3;8).

#### Status of Frame

A frame status can be defined in three ways:

- Good: a frame correctly received by the Traffic Analyzer tool.
- Bad: the Traffic Analyzer tool has detected a problem with this frame (e.g. a CRC problem).
- Null: a frame without any data.

#### Type of Frame

A frame type can also be defined in three ways:

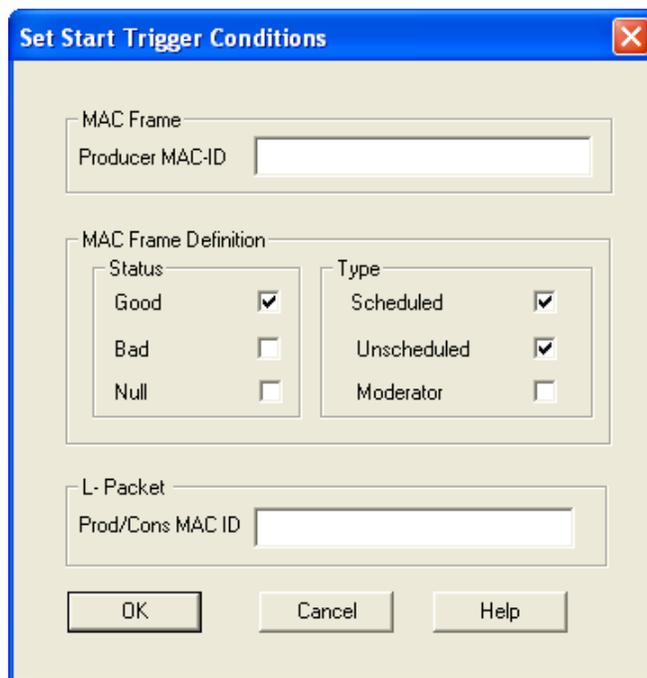
- Scheduled: Every scheduled node in sequential order is guaranteed one opportunity to transmit. Information that is time-critical is sent during the scheduled part of the interval. The bandwidth is reserved in advance to support real time data transfers. Real time data transfers include:

- real time control data (I/O updates)
  - analog data
  - peer to peer interlocking
- **Unscheduled:** All nodes transmit on a rotating basis in sequential order. This rotation repeats until the time allocated for the unscheduled portion is used up. The amount of time available for the unscheduled portion is determined by the traffic load of the scheduled portion. ControlNet guarantees at least one node will have the opportunity to transmit unscheduled data every interval. The starting node for each NUT rotates to guarantee each node will have an unscheduled transmit time. The remaining bandwidth supports non time-critical data transfers. Non time-critical data transfers include:
    - connection establishment
    - peer to peer messaging
    - programming (uploads and downloads)
  - **Moderator:** The node with the lowest MAC ID (node address) assumes the moderator role. The moderator frame is transmitted to keep the other nodes synchronized. This moderator frame is sent in the guardband.

Start and Stop triggers are defined on the frame conditions.

### Defining a Start Trigger

1. Choose *I/O Settings* from the *Options* menu on the Control window.
2. Click on the *Add Start Conditions* button to display the *Set Start Trigger Conditions* dialog.



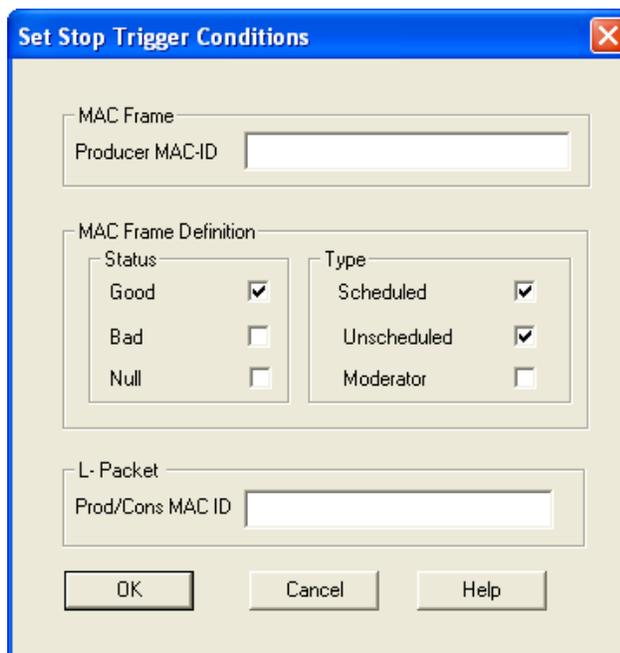
**Figure 6 - Set Start Trigger Conditions**

3. Enter the *Producer MAC ID* in the MAC Frame field. If you do not enter a value or values in this field, the full range (0-255) becomes the default value.
4. Select the Status in the MAC Frame Definition pane. One or more of these statuses may be selected, however at least one must be selected. Defaults to *Good* selected.
5. Select the Type in the MAC Frame Definition pane. One or more of these types may be selected, however at least one must be selected. Defaults to *Scheduled* and *Unscheduled* selected.
6. Enter the *Prod/Cons MAC ID* you want to trigger in each LPacket in the L-Packet field. If you do not enter a value or values in this field, the full range (0-255) becomes the default value.
7. Click the *OK button*.

The *Set Start Trigger Conditions* dialog closes and the new start trigger definition appears in the *START TRIGGERS* list on the *I/O Settings* dialog. This start trigger can now be selected and applied to the next capture session.

## Defining a Stop Trigger

1. Choose *I/O Settings* from the *Options* menu on the Control window.
2. Click on the *Add* button to the right of the *STOP TRIGGERS* pane in the middle of the *I/O Settings* dialog to display the *Set Stop Trigger Conditions* dialog.



**Figure 7 - Set Stop Trigger Conditions**

3. Enter the *Producer MAC ID* in the MAC Frame field. If you do not enter a value or values in this field, the full range (0-255) becomes the default value.
4. Select the Status in the MAC Frame Definition pane. One or more of these statuses may be selected, however at least one must be selected. Defaults to *Good* selected.

5. Select the Type in the MAC Frame Definition pane. One or more of these types may be selected, however at least one must be selected. Defaults to *Scheduled* and *Unscheduled* selected.
6. Enter the *Prod/Cons MAC ID* you want to trigger in each LPacket in the L-Packet field. If you do not enter a value or values in this field, the full range (0-255) becomes the default value.
7. Click the *OKI button*.

The *Set Stop Trigger Conditions* dialog closes and the new stop trigger definition appears in the *STOP TRIGGERS* list on the *I/O Settings* dialog. This stop trigger can now be selected and applied to the next capture session.

### Editing Trigger Definitions

1. Choose *I/O Settings* from the *Options* menu on the Control window.
2. Highlight the trigger you want to change in the list pane.
3. Click the *Edit* button to the right of the list pane with the highlighted trigger definition.

The system displays the appropriate edit screen with the definition of the highlighted trigger.

4. Edit the fields you want to change and click the *OK* button.

### Deleting Trigger Definitions

1. Choose *I/O Settings* from the *Options* menu on the Control window.
2. Highlight the trigger you want to change in the list pane.
3. Click the *Delete* button to the right of the list pane with the highlighted trigger definition.

The system deletes the highlighted trigger from the list.

## Technical Support

Technical support is available in several ways. The online help system provides answers to many user related questions. Frontline's website has documentation on common problems, as well as software upgrades and utilities to use with our products.

Web: <http://www.fte.com>, click Support

Email: [tech\\_support@fte.com](mailto:tech_support@fte.com)

If you need to talk to a technical support representative, support is available between 9am and 5pm, U.S. Eastern time, Monday through Friday. Technical support is not available on U.S. national holidays.

Phone: +1 (434) 984-4500

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