

# User Documentation for FDR Enhancement on Advantys STB NIP2212

This document outlines the Faulty Device Replacement service enhancements made to the existing Advantys STB NIP 2212 Ethernet Modbus TCP/IP Network Interface Module. This document only describes the changes made to the STB NIP2212. This document should be used in conjunction with ‘Advantys STB Standard Ethernet Modbus TCP/IP Network Interface Module Applications Guide – Reference Number 890 USE 177 00’.

## 1. Faulty Device Replacement

The Faulty Device Replacement (FDR) service simplifies the maintenance of Advantys STB Ethernet Network Interface Module (ENIM) connected to the Ethernet network. When an ENIM malfunctions, this service is used to replace it with a new one, without having to reconfigure it.

Once it is physically connected to the network, the new ENIM can retrieve its IP parameters and its device parameters (Master IP, etc.) from a DHCP server and an FTP server respectively. The Device configuration parameters are saved both locally on its Flash memory (to recover after system warm reboot or cold reboot) and remotely on one or more file servers (to recover after replacement).

### 1.1 Configuration Parameters

For the ENIM, the configuration parameters can be divided to two groups,

- IP Parameters – IP address relevant parameters assigned to the target ENIM:
  - IP Address
  - Subnet Mask
  - Gateway
- Device Parameters – Device relevant configurable parameters for the target ENIM:
  - Parameters stored on Master Controller Web Page
  - Parameters stored on Master Configurator Web Page

FDR services are required to automatically recover, or reconfigure, or restore all these parameters onto the new ENIM after replacement without a need for any manual reconfiguration procedure.

- Note that the Removable Memory Card STB XMP 4400 (SIM Card) must be used to save and restore the Advantys island configuration.

## **1.2 FDR Techniques**

- As discussed above, there are two groups of configuration parameters that are recovered by FDR services. The IP Parameters recovery relies on the IP acquisition functionality via DHCP provided by Role Name; the Role Name is specified using the rotary switches provided on the ENIM. Device Parameters recovery is accomplished using FTP/TFTP method.

## 2 Feature Summary

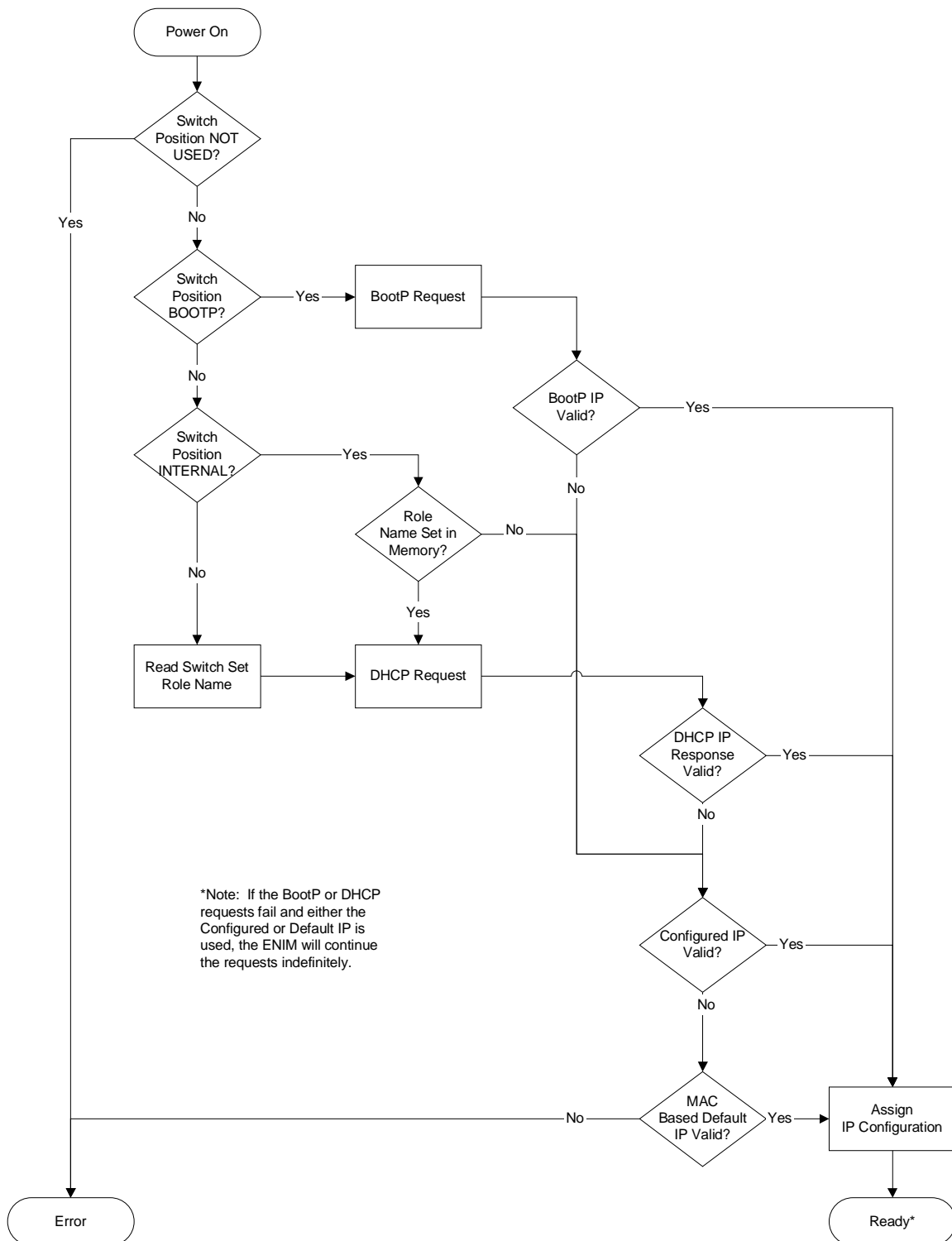
This section provides a list of new features provided by this software release. In this release, the following features will be included:

### 1) Rotary Switches functionality

The functionality of Rotary Switches will be similar to the existing ENIM except for DHCP and BOOTP positions as shown in the following table:

	Existing ENIM	New Deal ENIM
BOOTP	1. BootP request 2. BootP reply --> Assign IP 3. No BootP reply --> BootP request	1. BootP request 2. BootP reply --> Assign IP 3. No BootP reply --> Use Configured IP & Continue BootP request till BootP reply. Note: The BootP service will continue to run and reassign the IP address if BootP is successful. 4. No Configured IP --> Use MAC Based Default IP
DHCP	1. DHCP request 2. No DHCP reply --> Use Configured IP 3. No Configured IP --> Use MAC Based Default IP	1. DHCP request 2. No DHCP reply --> Use Configured IP & continue DHCP request till DHCP reply. Note: The DHCP service will continue to run and reassign the IP address if DHCP is successful. 3. No Configured IP --> Use MAC Based Default IP

The revised IP address assignment process flowchart is shown below:



- 2) ENIM Device parameters acquisition functionality with Multiple FDR Server configuration support
- 3) Configurable ENIM Device parameters File Backup/Restore Synchronization functionality
- 4) FDR Control Functionality
- 5) FDR Diagnostics
- 6) Configurable Ethernet Link Failure Mode: allows users to select either Fallback Mode immediately or Holdup Mode when Ethernet Link is broken. Please note, this feature is not considered as part of the FDR services.

### 3 Procedures for Using FDR services

This section provides the detailed procedures to setup a target system to properly use FDR services provided by this software release. The following items will be covered:

- FDR Services Preconditions
- System Setup and Connections
- FDR Server Configurations
- Rotary Switches Settings
- FDR Configuration Tools

#### 3.1 *Preconditions for FDR Services*

To properly use the FDR features and its services provided by this software release, the following conditions must be met:

- All relevant Advantys STB NIP 2212 Ethernet Interface Modules (ENIM) require a software upgrade with this software package. Ensure that all image versions on the target ENIM must be: version “1.7.0” or higher for Kernel, version “2.2.4” or higher for Exec and version “1.19.1” or higher for Web Site.
- The connected FDR servers must support compatible FDR functionality.
- Device parameter file modification/edit for any target ENIM devices on FDR server side must be prohibited at this time. It is not guaranteed that data integrity can be maintained.
- Before all relevant ENIM are up and running, all relevant FDR servers must be configured to include the address list which must contain the proper configuration for each target ENIM.
- At least one FDR server must be connected and configured on the target system.
  1. The FDR server(s) may be
    - Quantum NOE module
    - Premium ETY module

Note that when multiple servers are configured in the system, server types for multiple servers must be the same; i.e. both servers must be either Quantum NOE modules or Premium ETY modules.

2. If multiple FDR servers are configured in the system, Address Servers on both FDR servers must have the same address entry list for all target ENIM islands. Please ensure this precondition is met before powering up the target ENIM islands.

Note that Quantum Hot Standby systems disable the FDR services in the NOE modules.

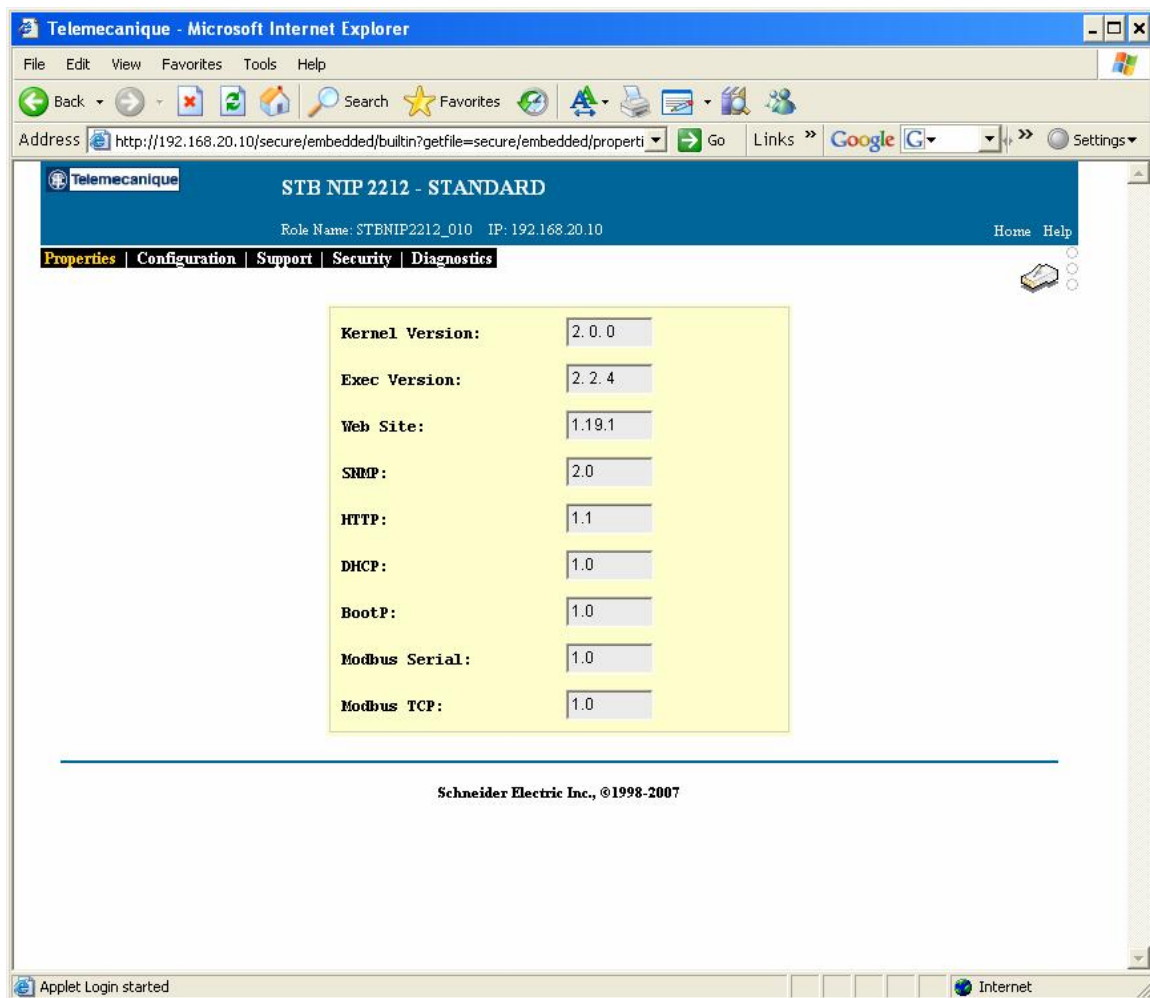
3. Ethernet connections or links among the FDR servers and all target ENIMs must be healthy.

## 3.2 ENIM Web Server

To support the FDR services new configuration tools have been designed and added to the current STB NIP Web Server. User can access the updated web server via HTTP as before. This section describes the functionality for FDR relevant web pages including modified existing pages and the newly added web pages.

### 3.2.1 Properties Page

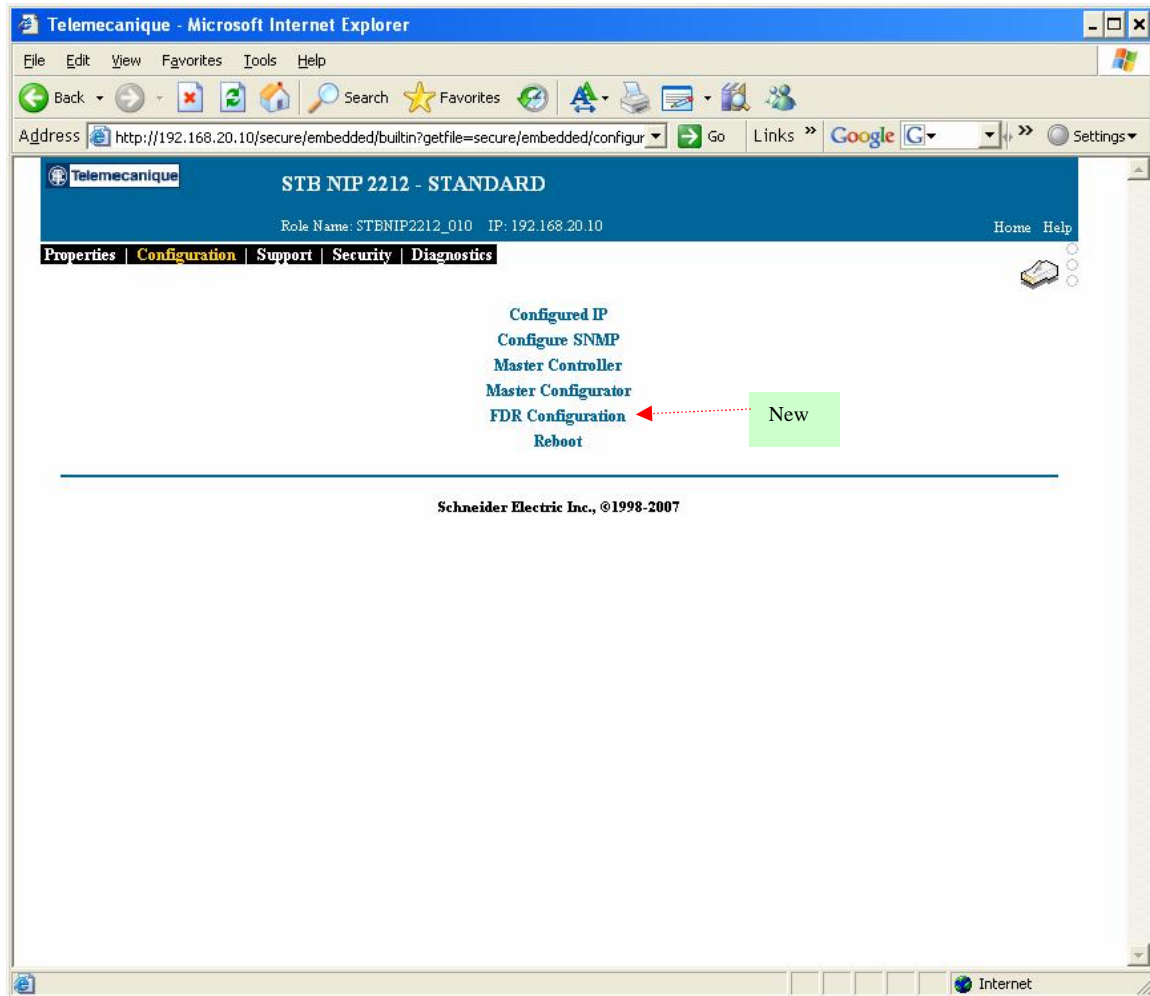
The updated Properties page supported in this software release is shown as below,



The properties page displays the version for each image running on the target ENIM device. For the ENIM to be FDR compliant ensure that all image versions on the target ENIM must be: version "1.7.0" or higher for Kernel, version "2.2.4" or higher for Exec and version "1.19.1" or higher for Web Site as shown above.

### 3.2.2 Configuration Page

The updated Configuration page is as shown below:



### 3.2.3 FDR Configuration Page

This new page allows users to configure the FDR relevant services as shown below,

Telemecanique - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address [http://192.168.20.10/secure/embedded/builtin?getFile=secure/embedded/conf\\_fdr](http://192.168.20.10/secure/embedded/builtin?getFile=secure/embedded/conf_fdr) Go Links Google G Settings

Telemecanique

STB NIP 2212 - STANDARD

Role Name: STBNIP2212\_010 IP: 192.168.20.10 Home Help

Properties Configuration Support Security Diagnostics

FDR Configuration

Role Name:

Server 1 IP Address:

Server 2 IP Address:

Check Time (minutes):

Auto Sync Mode:

Use Local Configuration: ☐

Save Reset Restore Backup

Schneider Electric Inc., ©1998-2007

Applet.com.schneiderautomation.nim.configapplets.ConfigureFDR started Internet

This page has the following fields,

- **Role Name** Text Field: Same functionality as the 'Role Name' web page for the existing ENIM.
- **Server1 IP** Text Field: allows user to specify IP address of the 1<sup>st</sup> FDR server. Valid entries are IP addresses in dotted decimal format.
- **Server2 IP** Text Field: allows user to specify IP address of the 2nd FDR server. Valid entries are IP addresses in dotted decimal format.
- **Check Time** Text Field: allows user to specify the time period for automatic file sync. The valid range is 2 to 1500 minutes with 30 minutes default.
- **Auto Sync Mode** Selection: allows user to specify the mode for automatic file sync between the ENIM Device Parameter File and the FDR Server Device Parameter File. There are 3 choices: *Auto Backup*, *Auto Restore* and *Disabled*; the default mode is *Disabled*. When Disabled is selected, no automatic file sync is performed. When Auto Backup is selected, ENIM Device Parameter File will be automatically uploaded to the FDR servers with a time period specified by the Check Time field; When Auto Restore is selected, the Device Parameter File saved on the FDR servers

will be automatically restored to the target ENIM with a time period specified by the Check Time field.

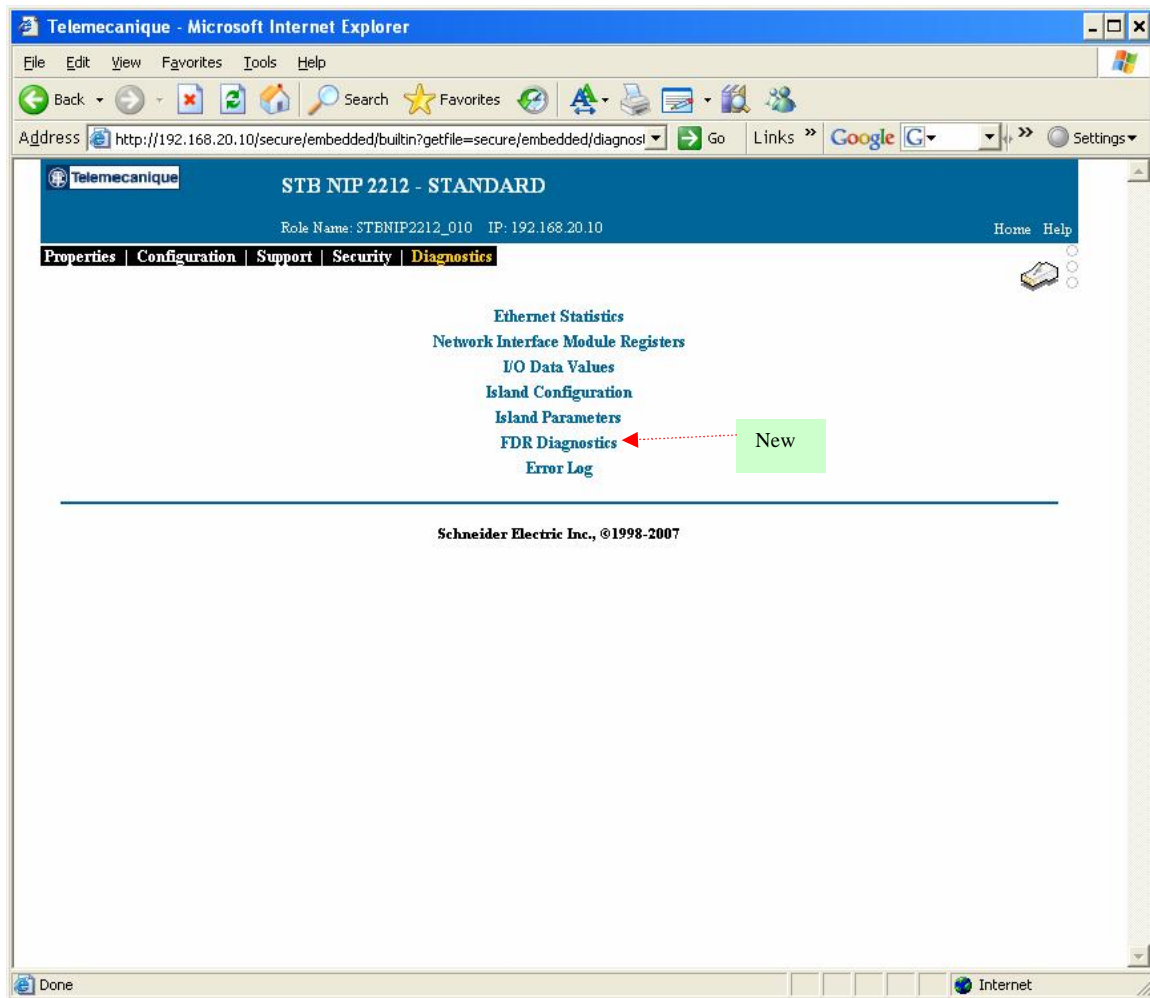
- Use Local Configuration Check Box: allows user to disable Device Parameter file acquisition from FDR server, Local Device parameters are used instead; the default selection is *Unchecked* i.e. use Device Parameters from FDR server. When the user intends to utilize FDR server for IP Parameters acquisition only then the user must perform the following steps:
  - Select (*Checked*) the Use Local Configuration Check Box.
  - Click the Save button.
  - Click the Backup button to upload the Device Parameter File to FDR server.
  - Recycle power to ENIM, when the ENIM restarts it will acquire IP Parameters from FDR server and will use the Local Device Parameters.
- Save Button: clicking this button saves the values (entered in the text fields above) to the ENIM Flash memory; overwrites any current values.
- Reset Button: clicking this button cancels any changes made to the values (entered in the text fields above); all fields revert to previously stored values.
- Restore Button: allows manual restore (download) of Device Parameter File from FDR server to the ENIM.
- Backup Button: allows manual backup (upload) of Device Parameter File from the ENIM to FDR server.

Note: When multiple FDR servers are configured in the system, for each FDR server, the servers' IP addresses should be entered in the Server1 IP Text Field and Server2 IP Text Field. Also, Server 1 IP and Server 2 IP Text Fields are not required when only one FDR server is configured.

Note: Whenever the local device configuration has been changed, the user should access this page to issue a Manual Backup command to upload the new configuration to the server target. Another way for doing this is enable the Auto Backup mode.

### 3.2.4 Diagnostics Page

The updated Diagnostics page is as shown below:



### 3.2.5 FDR Diagnostics Page

The FDR Diagnostics page is provided for users to monitor the current FDR related status of the target ENIM.

Telemechanique - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://192.168.20.10/secure/embedded/builtin?getfile=secure/embedded/diag\_fdr Go Links Google Settings

Telemechanique STB NIP 2212 - STANDARD

Role Name: STBNIP2212\_010 IP: 192.168.20.10 Home Help

Properties Configuration Support Security **Diagnostics**

FDR Diagnostics

FDR Status:	Operational	File Checksum:	0xf00f
Naming Scheme:	User Provisioned	File Size:	720
IP Status:	Offer Applied	File Updated:	TRUE
FILE Status:	File Downloaded	Manual Backup:	0
DHCP Attempts:	5	Auto Backup:	0
Address Server:	192.168.20.100	Manual Restore:	0
File Server:	192.168.20.100	Auto Restore:	0
File Name:	STBNIP2212_010.prm	FTP Errors:	0
File Header:	1.0STBNIP2212	SYNC Errors:	0

Schneider Electric Inc., ©1998-2007

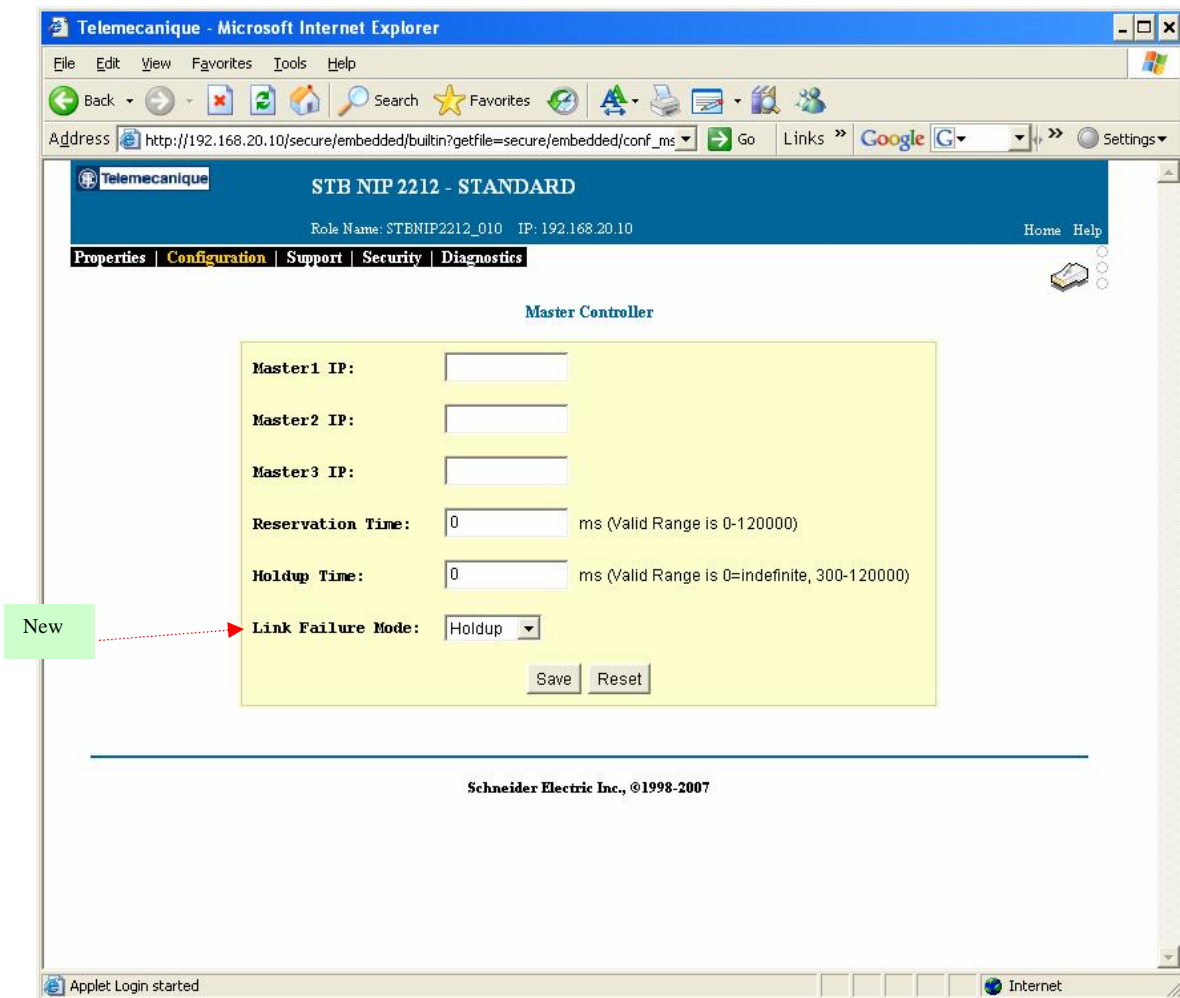
Applet Login started Internet

- **FDR Status** Text Field: displays the status of FDR services. “Operational” when FDR services available; “Not Operational” otherwise.
- **Naming Scheme** Text Field: displays the current Role Name assignment method. “Rotary Switches” or “User Provisioned”.
- **IP Status** Text Field: displays the status of IP acquisition process. “Offer Applied” if DHCP offer has been applied; “Fallback NoOffer” if no DHCP offer received and Default IP has been applied; “Fallback Invalid” if invalid DHCP offer received and Default IP has been applied; “Fallback Duplicate” if duplicate DHCP offer received and Default IP has been applied.
- **File Status** Text Field: displays Device Parameter file restore status. “File Applied” if served device parameter file has been applied; “File Empty” if the received served device parameter file is empty; “File Incompatible” if the received device parameter file is incompatible with ENIM; “File Corrupted” if the received file is invalid; “No Server” if no file server is accessible; “File Uploaded” if a file upload action is currently performed; “File Downloaded” if a file download action is currently performed.

- DHCP Attempts Text Field: displays the number of DHCP Discover messages sent to FDR server before a DHCP offer is received.
- Address Server Text Field: displays the IP address of the FDR Address server.
- File Server Text Field: displays the IP address of the FDR File server.
- File Name Text Field: displays the name of the device parameter file.
- File Header Text Field: displays the file header of the device parameter file.
- File Checksum Text Field: displays file checksum of the device parameter file.
- File Size Text Field: displays the device parameter file size (in bytes).
- File Updated Text Field: displays the synchronization status of device parameter files between the ENIM and FDR server(s). “TRUE” if synchronized; “FALSE” otherwise.
- Manual Backup Text Field: displays the number of manual file backup actions performed since the last system reboot. Resets to 1 when the count reaches 65520.
- Manual Restore Text Field: displays the number of manual file restore actions performed since the last system reboot. Resets to 1 when the count reaches 65520.
- Auto Backup Text Field: displays the number of automatic file backup actions performed since the last system reboot. Resets to 1 when the count reaches 65520.
- Auto Restore Text Field: displays the number of automatic file restore actions performed since the last system reboot. Resets to 1 when the count reaches 65520.
- FTP Errors Text Field: displays the number of FTP file transfer errors since the last system reboot. Resets to 1 when the count reaches 65520.
- SYNC Errors Text Field: displays the number of file synchronization errors since the last system reboot. Resets to 1 when the count reaches 65520.

### 3.2.6 Master Controller Page

The Master Controller page has been modified as shown below:



- Link Failure Mode selection: allows user to specify the mode when Ethernet Link fails. There are 2 choices: *Holdup* and *Fallback*; the default mode is *Fallback*. When Holdup mode is selected, the ENIM goes to fallback state after the Holdup time specified (on this page) expires; When Fallback is selected, the ENIM goes to fallback state immediately.

### 3.3 FDR System Setup Example

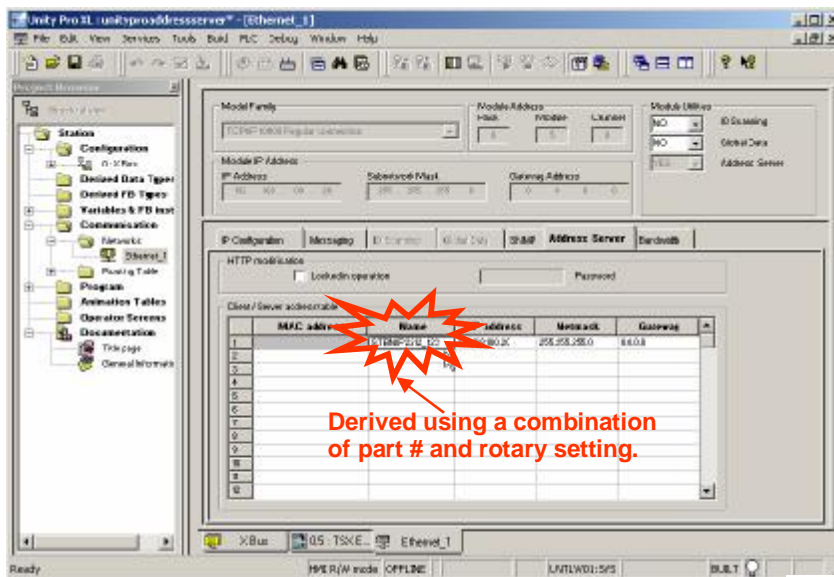
This section provides information on how to setup and configure a system to be able to use the FDR services. The following example describes the steps during following lifecycle phases of the ENIM:

- Design
- Install

- Commission
- Operate
- Maintain

### 3.3.1 Design Phase Steps

- n Select / assign a unique Role Name for ENIM using rotary switches – *Existing Step, no change*
  - o Role Name is associated with a unique IP address, subnet mask and default gateway
- n Select Device Configuration parameters – *Existing Step, no change*
  - o Master Controller parameters
  - o Master Configurator parameters
- n Configure Advantys island – *Existing Step, no change*
  - o Using Advantys CSW tool build island configuration
- n PLC Address Server configuration – *Existing Step, no change*

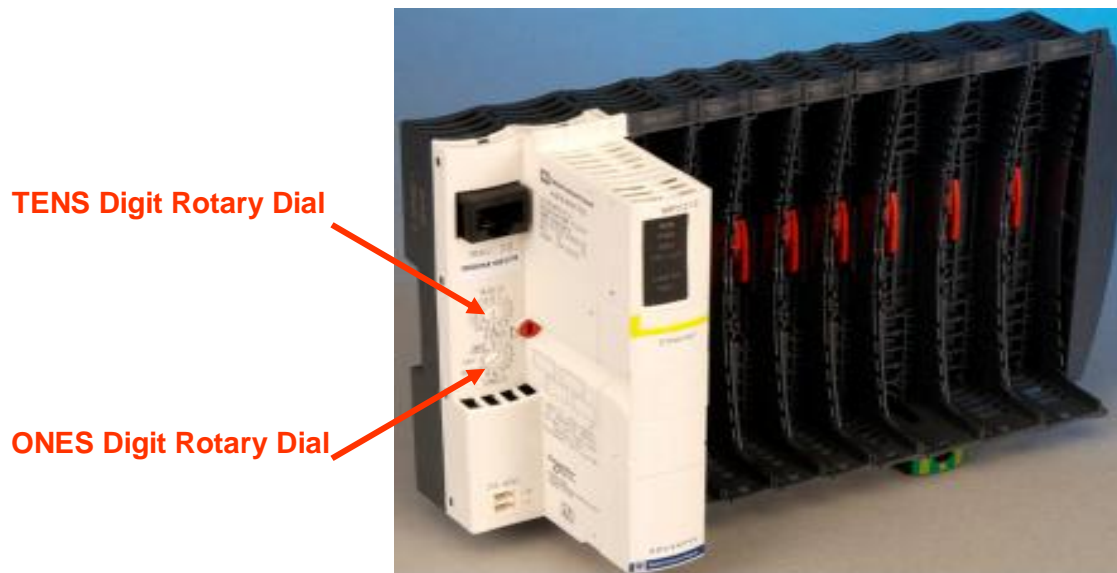


FDR Server



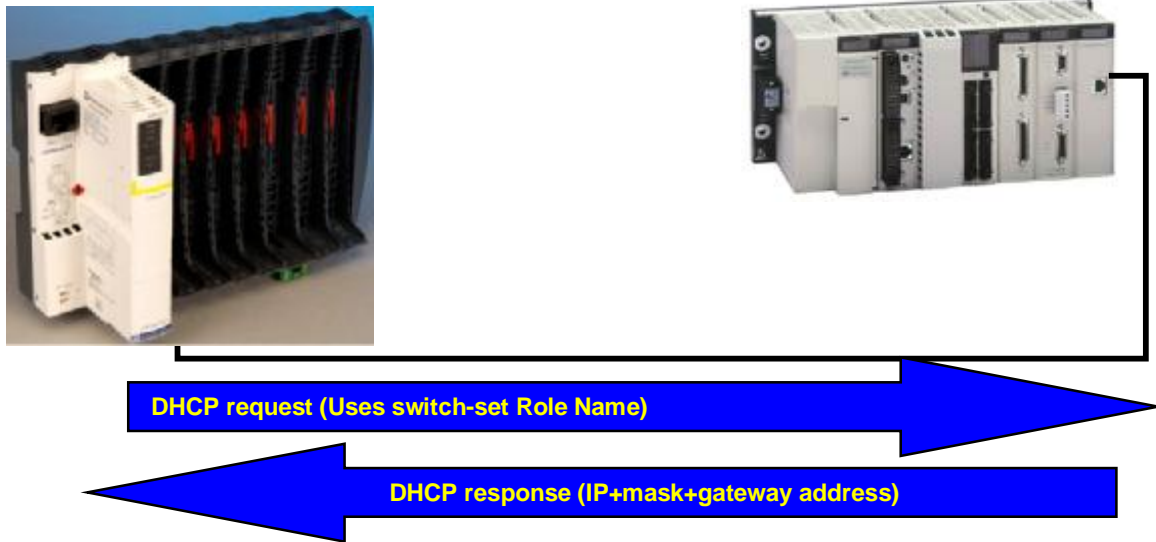
- Enter the Role Name (A combination of part # and rotary setting. Ex. STBNIP2212\_123)
- Assign the ENIM with an IP Address
- Assign the ENIM with a Subnet Mask and Gateway Address
- Download the configuration to the PLC
- If using multiple FDR servers, repeat the above steps for the second FDR server. Must ensure that on both servers, the IP parameters must be same for the same Role Name.

### 3.3.2 Install Phase Steps



- n No significant deviation from current practice
- n *Set Role Name using rotary switches – Existing Step, no change*

### 3.3.3 Commission Phase Steps



- n Commission the Advantys island – *Existing Step, no change*
  - o Verify input / output modules operation
- n Save island configuration to SIM card – *Existing Step, no change*
- n Connect Advantys island on Ethernet network – *Existing Step, no change*
  - o The ENIM receives its IP address from DHCP server
- n Enter Device Configuration parameters (Master IP etc.) – *Existing Step, no change*
- n Enter IP Addresses of FDR Servers – *New functionality*
  - o Access the new FDR Configuration web page on the ENIM
  - o Enter IP Addresses of Two FDR Servers
    - n *Ensures that the device parameter file is saved to at least two locations*
    - n *If only one FDR server is used then not required to enter IP address of FDR server*
- n Upload the parameter file to FDR server(s) – *New functionality*
  - o Access the new FDR Configuration web page on the ENIM
  - o Upload the configuration parameters to FDR server(s)
  - o The FDR server(s) is now configured

### 3.3.4 Operate Phase Steps

- n No significant deviation from current practice
- n Select parameter file 'Auto Backup' function – *New functionality*
  - o Access the new FDR Configuration web page on the ENIM
  - o Select 'Auto Backup' function
  - o Configure the delay (in minutes) between two backups
  - o ENIM periodically uploads parameter file to FDR server(s)

### 3.3.5 Maintain Phase Steps

- n No significant deviation from current practice
- n SIM card replacement – *Existing Step, no change*
  - o Remove SIM card from failed ENIM
  - o Install SIM card into the replacement ENIM
- n Set Role Name switches on replacement ENIM – *Existing Step, no change*
  - o As described in Install phase
- n Advantys island connected on Ethernet network – *Existing Step, no change*
  - o The ENIM receives its IP address from FDR server
  - o As described in Commission phase
- n The ENIM restores parameter file from FDR server – *New functionality*
  - o Send FTP Request (Restore File)
  - o FTP Response File (File Name Ex. STBNIP2212\_123.prm)
  - o ENIM Device Parameters (Master IP, etc.) Configured