

# DNP3 Router

## Release Notes

A-DNP3R

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Firmware Revision 1.032

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# 1. PREFACE

## 1.1. COMPATIBILITY

Firmware revision 1.032 of the DNP3 Router will require the following compatible versions:

Software	Version
Slate	1.042 and later

## 1.2. NOTES

The following should be noted:

- Firmware upgrades will be done using Aparian's Slate software.
- Aparian flash files have an *.afb* extension.
- Slate can also be used to set the initial network parameters using its DHCP server.
- Should any interruptions cause the module to not complete the firmware upgrade the module will return to Safe Mode. The user can then re-flash the module with the application firmware. See the user manual for more information regarding Safe Mode.

## 1.3. ADDITIONAL INFORMATION

The following resources contain additional information that can assist the user with the module installation and operation.

Resource	Link
Slate Installation	<a href="http://www.aparian.com/software/slate">http://www.aparian.com/software/slate</a>
DNP3 Router User Manual DNP3 Router Datasheet Example Code & UDTs	<a href="http://www.aparian.com/products/dnp3router">http://www.aparian.com/products/dnp3router</a>
Ethernet wiring standard	<a href="http://www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installation/guide/cde205_220_420_hig/Connectors.html">www.cisco.com/c/en/us/td/docs/video/cds/cde/cde205_220_420/installation/guide/cde205_220_420_hig/Connectors.html</a>
CIP Routing	The CIP Networks Library, Volume 1, Appendix C:Data Management
DNP3	<a href="http://www.dnp.org">http://www.dnp.org</a>

## 1.4. SUPPORT

Technical support will be provided via the Web (in the form of user manuals, FAQ, datasheets etc.) to assist with installation, operation, and diagnostics.

For additional support the user can use either of the following:

Contact Us web link	<a href="http://www.aparian.com/contact-us">www.aparian.com/contact-us</a>
Support email	<a href="mailto:support@aparian.com">support@aparian.com</a>

## 2. IMPROVEMENTS

The following updates are included in this firmware revision.

Revision	Improvement	Description
1.032	Broadcast management	Better management of ARP client list in networks with many broadcasts.
	TCP ECN & CWR	Added ability for the DNP3 Router to communicate to a PC using TCP ECN & CWR.
1.031	Event Log	When event log load fails during power up then the event log table will be reinitialized to continue operating.
1.030	Event Unload Count	Increased Max Unload Count for events when the DNP3 Router is in Reactive Mode (Outstation) to 250.
	Max Application Segment size	Set the max application segment size to 4096 from 8192.
	TCP Ack Wait	Add parameter to buffer TCP outgoing packets for retrying multi-packet responses.
	Ethernet TCP	Increased robustness to the Ethernet TCP when packets is being dropped (due to intermittent communication).
1.029	Event Unload Count	Added a parameter to set the maximum events to be unloaded per response.
	Max Event Count	Added parameter to set the maximum number of events to be logged per DNP3 Group before rolling over.
1.028	Application Segment size	Add configurable maximum application segment size.
	TCP retry	Add configurable TCP retry timeout and TCP retry limit.
	DNP3 TCP	Allow for more than one DNP3 packet per TCP segment.
1.027	Master Events	Add 64bit alignment required for Logix v27+ when unloading Master Events into the Master Event logix UDT.
	Time Needed	Add CIP message that will allow the DNP3 Outstation to force the Time Needed bit in the DNP3 Indicators.
	Ethernet TCP	In Master Mode (Scheduled) add support for Outstations that are on a different subnet using the Default Gateway
1.025	DNP3 TCP	Improvement in TCP resilience

## Improvements

1.023	Bulk Read/Write	Added support for Group 102 – Unsigned Integer allowing users to do bulk read/write of data.
	Ethernet TCP	Improved stability
1.021	Repeater	Add serial repeater functionality as well as Ethernet routing.
	Scheduled Retry	Add retry for Scheduled messages.
	Confirm Delay	Add configurable delay for event confirm.
1.020	DNP3 Security	Added DNP3 Secure Authentication to Unscheduled mode
	Remote Key Update	Added ability to remotely change the DNP3 Update Key in Scheduled and Unscheduled mode
	Key Change Interval	Added interval time to force the DNP3 Router to update session keys.
	Local Key Update	Added functionality to allow the user to change the Update and Transfer keys from Logix using a MSG instruction.
1.019	Aggressive Mode CSQ	Add option to link CSQ of unsolicited to aggressive mode requests.
1.018	Micro800	Add support for Rockwell Micro800 Controller range.
1.016	DNP3 Events	Allow for Logix to trigger an event and not just use deadband
	DNP3 Unsolicited Commands	The DNP3 Router (in master mode) will continue with normal operation even if the DNP3 Outstation does not support DNP3 Unsolicited commands
1.015	DNP3 Unsolicited Responses	Added support for TCP Connection creation when in outstation mode and using unsolicited responses.
	DNP3 Unsolicited Responses	Added ability to set DNP3 TCP connection timeout.
1.014	DNP3 Outstation	Support multiple operate messages in a single request
	EtherNet/IP	Only allow a single class 1 CIP connection
	DNP3 Scheduled	Supports an array of operate messages in Scheduled mode
	DNP3 Scheduled	Will now update time in outstation if requested.
	DNP3 Scheduled	Will now reset restart bit in outstation if set.
	DNP3 Scheduled	Add support for event unloading (Class, Group, or Unsolicited Mode)
	DNP3 Outstation	Add Multi-Master support when operating Outstation mode.
	DNP3 Outstation	Add Master Node and IP filtering
	DNP3 Outstation	Add Event Count / Time buffering for unsolicited messages
	DNP3	Add Security for Unsolicited responses.
1.013	None	-
1.011	EtherNet/IP	Added CIP statistics
	DNP3 Outstation	Add support for integrity poll
	DNP3 Outstation	Add support for variation 0 requests
	DNP3 Outstation	Add support for Cold Restart
	DNP3 Outstation	Add support for updated of DNP3 Time
	DNP3 Outstation	Add support read/write for Internal Indicators
	DNP3 Outstation	Add support for Device Attributes
	DNP3 Outstation	Add support for Broadcast messages
	DNP3 Outstation	Add support for ranged requests over multiple mapped items
	DNP3 Events	Add support for DNP3 Events
	DNP3 Events	Add support for unsolicited responses
1.009	EtherNet/IP	Updates to EtherNet/IP and CIP communication to comply with latest ODVA certification.

	DNP3	When DNP3 Master update the qualifier for any form of write/operate to use the recommended format.
	DNP3	Update Date/Time object write qualifier.
	DNP3	Update event reading qualifiers
1.008	DNP3	Updated DNP3 retry
1.006	EtherNet/IP	Add retry functionality when no response was received
	Mapping Counters	Cleared with download
1.005	EtherNet/IP	Minor improvements to communication stability.
1.004	Security	Minor improvements to security
	EtherNet/IP	Improved communications.
1.003	None	-

### 3. ANOMALIES FIXED

The following anomalies have been fixed in this firmware revision.

Revision	Anomaly	Description
1.032	None	-
1.031	Unsolicited Responses	Resolved anomaly that could cause the DNP3 Router to reply with empty unsolicited responses.
	TCP out of order	Resolved anomaly that could cause the DNP3 Router to reboot when certain TCP packets arrive delayed and out of order.
1.026	ENIP	Fix anomaly that could cause the module to reboot or lose configuration when operating in scheduled mode and the Ethernet cable is unplugged.
	TCP retry	Fix issue with TCP retry that could cause unscheduled ENIP responses to fail when the request timeout is set to 500ms.
1.025	Master Events	Fix issue where when Master Event UDT is incorrect it could stop the Master from doing other communication.
1.024	Event Overflow	Resolved anomaly that could cause the module to reboot when events are at max and busy overwriting faster than the Master can unload.
1.023	Serial Communication	Fixed issue where sometimes secure authentication confirms would not correctly encode the data when using Serial protocol in Scheduled Mode.
1.022	Data Link Services	Resolved anomaly when using Data Link Services with Ethernet TCP/UDP.
	Events	Resolved anomaly where event indexes above 255 would not be reported correctly.
1.019	Aggressive Mode	Fixes to aggressive mode requests (Master mode) and processing of these requests (Outstation mode).
	Events	Fixes to DNP3 Event unloading using unsolicited messages.
	Events	Fix to DNP3 Master mode event unloading into Logix.
	Confirm	Fixes to DNP3 Secure Confirm.

1.018	Secure Confirm	Fix updating of challenge data in confirm receive when in Outstation mode.
	Application Sequence	Fix DNP3 Master application sequence numbers to run to max of 15.
	Unsolicited Confirm	Fix DNP3 Master unsolicited application sequence number that every now and then was returned as zero.
1.017	Secure Confirm	Update Event confirm in Outstation mode to use the critical functions list to determine if Confirm function must be in Secure Authentication format.
1.016	Map Item Success	Fix issue where in Reactive mode the Map Item success count increases even when the CIP message was not successful because of an incorrect data type.
1.013	Ethernet	Fix for certain broadcast Ethernet packets that were being re-broadcasted.
1.012	EtherNet/IP Management	Resolved bug in the EtherNet/IP management causing ENIP and TCP clients to timeout too fast due to inactivity.
1.011	DNP3 Binary	Fix binary read/write offset.
1.010	Aggressive Mode	Fix aggressive mode with updated Secure Authentication
1.009	DNP3 Operate Function	Fix issue where under certain circumstances the DNP3 Operate does not correctly reply with the entire response when using prefix indexes.
	Secure Authentication	Fix challenge sequence number rollover check.
	Secure Authentication	Fix DNP3 Master key handling with multiple DNP3 Slaves
1.008	Aggressive Mode	Fix aggressive mode when using select-operate functionality
	DNP3 Group	Fix DNP3 Group 3 handling.
	DNP3 Select/Operate	Fix response to Operate step
1.007	DNP3 Write	Fix anomaly where DNP3 Write would cause an incorrect offset when writing to more than one element.
1.006	Message Buffer	Fix handling of buffer overflow
	DNP3 Security	Fix incorrect session key update when using AES-GMAC encryption
	Other	Minor bug fixes
1.004	Security	Fix Secure Authentication MAC validation anomaly.
1.003	Message Timeouts	Fix incorrect message timeout which can cause the message que to go out of sync.

## 4. KNOWN ANOMALIES

The following known anomalies exist in this firmware revision.

Revision	Anomaly	Description
1.032	None	-