

ControlByWeb 400 Series Firmware v3.13.7.9 Release Notes

OVERALL IMPROVEMENTS

3.13.7.9

- General Improvements and Minor Bug Fixes

TASK BUILDER AND REGISTERS

3.13.7.5

- The X-404 passthrough mode was changed so Modbus Slave ID 248 now returns the internal registers of the X-404. This allows the X-404 to talk to other 400 Series devices and map their I/O to Modbus registers.

3.13.7.4

- Fixed missing Auto Reboot from X-WR-441 and X-432, and added to X-404 since Modbus registers can control relays to cycle power.

3.13.7.3

- Fixed bug with task actions involving analog outputs where the action would be set back to the 'Set To' action when you viewed the edit page.
- Fixed bug where the conditional task action being set to 'Set To Cond I/O Val' assumed the I/O being set in the action was a Boolean value and forced a 1 or 0. Now it checks for a Boolean data type; if it's not, it will set the I/O to the actual I/O value in the conditional statement.
- Fixed bug with the Condition on Scheduled tasks not using the correct Schedule Task state.

MQTT

3.13.7.5

- Increased subscriber topic length from 50 to 100 characters.

3.13.7.3

- Enabled Server Name Indication (SNI) for encrypted connections to MQTT Brokers. This is required for some brokers such as HiveMQ and also improves the connection speed and data usage for the TLS handshake.

BASIC SCRIPTING

3.13.7.3

- Fixed an issue where BASIC wouldn't always start when enabled.
- Fixed the issue with BASIC being disabled when using a Cloud connection and not always starting.

CELLULAR

3.13.7.3

- Added support for LWM2M FOTA operations and rebooting the modem without power cycling the modem.
- If the cellular network's provided netmask is 255.255.255, a private IP in the cell address range will also try to match 255.255.255.0 (needed for cellular VLAN support).
- Changes needed for Verizon certification.
- Cellular status page now displays the cellular IP address.

SYSTEM IMPROVEMENTS

3.13.7.4

- Added Relay mode 2 to API that will pulse a relay if the relay is off; if on, it won't pulse it off. Call in URL like <http://192.168.1.2/state.json?relay1=3>

3.13.7.3

- Fixed bug enabling WPA2 or WPA3 Enterprise security would break the Wi-Fi connection retries
- Fixed bug where you could not send remote device messages from a scheduled task.
- Minor change to retry timing of remote services.
- We changed the Remote Service version 1 retry timing. Now, we try in 2 seconds for a few times, then 5 seconds, and then the remote services interval.
- Added support for SNMP GET BULK request.
- Changed the default NTP host to pool.ntp.org to allow a wider selection of NTP hosts worldwide.

Firmware Changes from 3.12.2.5

OVERALL IMPROVEMENTS

3.13.6.8

- The software controlling the relays on X432 devices was rewritten to ensure correct operation. Previously, if many relays were simultaneously changing state, some state changes were ignored. Now, all relays change state as expected.
- Corrected the issue of analog inputs reading inaccurately.
- **FridgeAlert**—Fixed the issue of the touchscreen not responding on cellular units.
- Changed FridgeAlert timeout from 300 seconds to 1 hour (3600 seconds).

3.13.6.6

- **X-432**—The software controlling the relays on X432 devices was rewritten to ensure correct operation. Previously, if many relays were simultaneously changing state, some state changes were ignored. Now, all relays change state as expected.
- The relay state is stored in battery-backed RAM once a second to capture the current state. Previously, it was written that every time a relay changed state for any reason, leading to potentially inconsistent captures of the relay state due to frequent relay state changes.

- **Analog devices (X-412, X-418, X-420)**—This resolves the issue of being unable to set some analog inputs to the 0 to 10 V input range.
- **Brownout protection.** Stop saving to the Flash if the power supply voltage drops below 8 volts. There are messages in the SYSLOG when this process starts, and when the process stops, after the voltage resumes above 8 volts, we restart saving readings to the Flash and write a SYSLOG message. At power-on, the system ensures the input power remains consistently above 8 volts for 3 seconds before powering up the device. This should help prevent Flash corruption issues with brownouts or intermittent power at startup.
- Added a system option to ensure the device has consistent power for 1 minute before booting up. Enabled this by `/setcfg?wloptions=100`. This persists even when the configuration is set to Factory Reset.
- Fixed issue with emailing reports when the Control page widgets have been reordered.

3.13.6.1

- **X-400**—The X-400, when connected to expansion modules, would occasionally reset to Factory Defaults when powered on. This occurred if the expansion card had the interrupt signal asserted at power up, causing the unit to think the RESET button was held down and perform a factory reset. The new firmware prevents this from happening.
- **X-432** - SPI driver commands now run from a single thread. This prevents a condition in which Relay commands are not executed correctly.
- **X-400C** now detects if the TCA95X5 expansion port IC is installed to control the modem. The modem won't come up if the TCA95X5 isn't installed or working. In this condition, the new firmware prevents the device from waiting for the modem to respond.
- The Control Page refresh speed is more responsive following any user interaction. Previously, it was set to 2 seconds if a local interaction occurred (e.g., turning on a relay). Now, if the update rate is 1 second, the screen will refresh in 0.5 seconds; for 2 seconds, it refreshes in 1 second, and for 3 seconds or longer, it will refresh at the previous default of 2 seconds.
- The ControlByWeb Integration Manual is now online at https://controlbyweb.com/firmware/Integration_Manual_v1.0.pdf
- Added the DeviceInfo command `/setcfg?deviceInfo=?`
This gives a display like:

```
Device Info: 2:0:2:6
Model: X-410CW-I 2:0:2:6
SerialNumber: 000CC8062002 2:0:2:6
FirmwareBuild: 3.13.7.3 (v3.13.7_all_products_release-21) Built May 27
2025 12:16:07 2:0:2:6
Device Uptime: 1 days 00h 47m 29s 2:0:2:6
VSupply: 13.3 Volts 2:0:2:6
Flash Erasing: 0 Vendor ID: C8 2:0:2:6
Option Flags: 0x00000000 2:0:2:6
System Flags: 0x00000004 2:0:2:6
WLOption Flags: 0x00000000 2:0:2:6
WLOptions CellOptions: Mode=CatM1 WLOptions: 2:0:2:6
IO Has Port Expander = 1 2:0:2:6
Cell Modem: ME310G1 2:0:2:6
Cell Modem Firmware: M0C.200005 2:0:2:6
```

```

Cell Modem IMEI: 016577000000041 2:0:2:6
Cell SIM ICCID: 89148000008959917943 2:0:2:6
Cell SIM MSISDN: 5887010881,147 2:0:2:6
Cell Carrier: Verizon Wireless 2:0:2:6
Cell Carrier APN: vzwinternet 2:0:2:6
Cell Device IP: 10.80.63.136 2:0:2:6
Cell RSSI Signal: -79 dBm 2:0:2:6
Cell Registration Status: Registered(Home). (1) 2:0:2:6
Cell #RFTST: '311 480',5230,-105,-72,-
18.0,0d12,00,,128,3,0,032EE04,'234106499800210','Verizon
Wireless',3,13,720,14400,96 2:0:2:6
Cell #MONI: Verizon Wireless RSRP:-105 RSRQ:-18 TAC:0D12 Id:032EE04
EARFCN:5230 PWR:-79dbm DRX:128 pci:136 QRxLevMin:0 TA:14 2:0:2:6

```

- Added /setcfg/factoryReset=Y (exact case) to allow resetting to factory defaults without rebooting with the reset button held down.
- Fixed missing return in email string to SMTP server. The error was "Message contains bare LF and is violating 822.bis section 2.3"

We have added a 30-second timer after a firmware update. The system must run for 30 seconds before the new firmware is marked as valid. If the system reboots before this, the update is ignored. When updating firmware, ensure the device remains powered up for over 30 seconds after bootup.

TASK BUILDER AND REGISTERS

3.13.6.6

- The number of registers increased to 64, except for the X432, which has 61 registers due to its large number of local I/O, and the X404, which has 96 registers, due to the large number of registers required when interfacing with Modbus devices.
- Registers can be compared to other I/O, including other Registers, for Scheduled and Conditional Tasks. If either of the two registers changes value, the comparison is executed.
- Relay pulse time can now be specified using a register value. Previously, you could only select a hardcoded value for the relay pulse time.
- Updated the number of conditional tasks to 70. Verified conditional task reordering works with the increased number of tasks.

3.13.6.1

- Allow a conditional trigger on register change, not just =, <, or >

Increased number of Registers from 32 to 64 on the X-400, X-404, X-406, X-410, X-412, and to 61 on X-432. Every other device stays at 32 registers.

MQTT

3.13.6.8

- IO Qualifiers (Count, Frequency, PulseTime, OnTime, TotalOnTime) now send the correct value if included in the MQTT Payload.
- Updated broker hostname and password to 128 characters.

3.13.6.6

- If two brokers are specified, Log values will only be sent to the broker specified in the MQTT Log publication.
- If you leave the MQTT broker name blank, hostname blank, or the port set to 0, it disables the MQTT broker.

3.13.6.1

- The Publish on Change setting now allows Analog inputs (including ones configured as Digital Inputs) to trigger a change
- The standard Publish body increased from 200 to 500 characters.
- Increased from 10 to 100 outgoing MQTT buffers. Used for QOS=1 or 2 to store messages waiting for acknowledgments.
- Log entries can now be sent using MQTT. There is a separate Publish section for MQTT Log entries, which can be up to 1000 characters. Log entries are sent once per minute. All log entries during that one-minute interval will be sent.
- Added the following MQTT keywords:

Epoch Time Stamp (sec or ms)	<code>\${dateTime}</code> or <code>\${dateTimems}</code>
Up Time (sec)	<code>\${upTime}</code>
RSSI (cellular only)	<code>\${rssi}</code>
Sequence Number (autoincrementing)	<code>\${seq}</code>
Latitude	<code>\${latitude}</code>
Longitude	<code>\${longitude}</code>

For Logged MQTT Published entries:

Log Epoch Time Stamp (sec or ms)	<code>\${logDateTime}</code> or <code>\${logDateTimems}</code>
Log Event Type or Source	<code>\${logEventType}</code>
Log Entry ID	<code>\${logEventID}</code>

- Subscribed topics can be either SparkPlugB using protocol buffers for the data or sent as JSON or plain text. (Ex. Subscribed JSON packet: `{"relay1":1}`. If plain text, this can be any IO command you send with STATE.JSON or STATE.XML)
- The Keep-Alive interval will set the ping time to the minimum possible if there has been no other communication with the Broker.
- The MQTT Heartbeat default payload is fixed to show the correct JSON code.
- The MQTT Broker now has a setting for how long to wait between messages. This is for brokers that can't handle fast messages. The time is listed in seconds.
- Several SparkPlugB improvements for integration with Ignition and ThingsBoard dashboards.

BASIC SCRIPTING

3.13.6.8

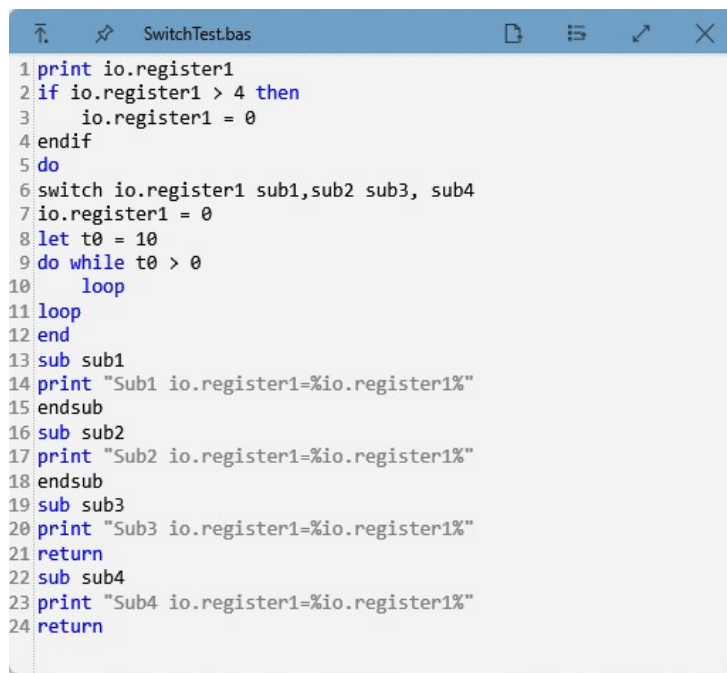
- BASIC now only restarts when I/O or Logging is changed. Before, it would restart for almost any change to the device.
- NAN is now recognized as Not a Number (before it was looking for nan).

3.13.6.6

- Added absolute variables with `| |` on either side of one of the internal BASIC variables `a..z`. `|a| = io.register1` will assign the absolute value of `io.register1` to `a`. `io.register1 = |a|` will assign the absolute value of `a` to `io.register1`.
- A variable `swver` was added that returns the software version as an integer. Ver 3.13.6.56 returns 31365 as the value. Beta releases of software have 90 added to the release number (e.g., 931364)
- 20 persistent memories were added to Flash as variables `m0..m9`, `ma..mj`. When the memory variable is written, it will only update the Flash memory if the value changes. These can be used to store configuration parameters and set registers to the values at start-up. Care should be taken not to write to these values too frequently.
- IF and FOR loop statements now work correctly if the value is -1

3.13.6.1

- The BASIC Script increased in size to 12 K.
- Fixed issue with Disabling and then reenabling scripts.
- BASIC CALL, FOR, IF, and DO loops can be nested 10 deep.
- Added `cell.rssi` as a BASIC variable to get the current cell RSSI.
- Added REBOOT command to reboot the device in 4 seconds.
- Changed SELECT and SELECTC to SWITCH and SWITCHC calls. This allows one of many subroutines to be called based on the variable's value passed to the SWITCH/SWITCHC statement. SWITCH will continue after execution; previously, it would loop continuously within the SWITCH statement.



```
1 print io.register1
2 if io.register1 > 4 then
3   io.register1 = 0
4 endif
5 do
6 switch io.register1 sub1,sub2 sub3, sub4
7 io.register1 = 0
8 let t0 = 10
9 do while t0 > 0
10  loop
11 loop
12 end
13 sub sub1
14 print "Sub1 io.register1=%io.register1%"
15 endsub
16 sub sub2
17 print "Sub2 io.register1=%io.register1%"
18 endsub
19 sub sub3
20 print "Sub3 io.register1=%io.register1%"
21 return
22 sub sub4
23 print "Sub4 io.register1=%io.register1%"
24 return
```

MODBUS

3.13.6.1

- **X-404 Modbus Master** - All Endian and byte orientations are fixed and supported correctly.

CELLULAR

3.13.6.6

- Remote Cloud retry interval has been shortened when using cellular radio. It now tries three times at 1 minute, three times at 3 minutes, three times at 10 minutes, three times at 15 minutes, and then every 30 minutes.
- Added RFSTS (RF Status) and MONI (Monitor) reporting of the current cellular connection. This provides detailed technical information about the cellular connection, including tower and signal parameters. This can be seen in the `/diagnostics.json` or `/setcfg?deviceInfo=?` commands.
- Clear the FPLMN (Forbidden Carrier list) from the SIM on each bootup.

3.13.6.1

- If the device fails to make a cellular connection, it will not reboot if it is in Registration (searching), airplane mode, or powered on. It will continue to reboot the modem and restart the modem code.
- We have added a user setting to cellular mode to specify the number of modem power cycles performed before the device reboots. A value of 0 will prevent the device from rebooting.
- The `state.json` and `state.xml` commands, as well as cloud device polling, now report the device uptime and the cellular RSSI.
- We revised the procedure for activating the cellular modem. Now, it will get the ICCID and IMEI before turning on the cell radio.
- If an external modem command is queued up, it will be executed before a cell reset.
- The cell modem auto-sets the baud rate if set to 115K, 230K, 460K, or 912K baud. You can set the cell modem baud rate to 912K with `cellOptions=0100`.
- The setting `cellOptions=0200` will set the Ethernet port to use 20 seconds for DNS retry

SYSTEM IMPROVEMENTS

3.13.6.6

- Removed the default IP address constraint for changing the MAC address.
- White Label MAC settings. If the White Label mode is turned off during a factory reset, the white label MAC address is set to the CBW MAC address.
- On boot up, it checks the total Settings partition size and prints a critical warning if more than 131072 bytes are used.
- If the system encounters a System Panic, it writes a debug log to Flash. This can be retrieved at `/coredump.bin` (e.g., <http://192.168.1.2/coredump.bin>). E-mailing that to support, along with the device MAC address, software version, and exact model number, can help us diagnose the problem.

- Corrected issues where a watchdog timeout was incorrectly detected, or the system would not reboot but hang after a watchdog timeout.
- Increased Debug buffer size for long debug lines.
- If SYSLOG debug is enabled, UART debug is turned off to prevent interaction between the two debug streams.
- The available system heap memory has been dramatically increased for application use.

3.13.6.1

- Added SYSLOG entries when bootup completes and when new firmware is validated.
- We have added the Remote Cloud service state to the end of the debug lines, along with the Ethernet/Wi-Fi/Cell network connection state. *The value is shown from 0 to 15.*
- Loading device configuration files allowed data strings to increase from 160 to 650 characters.
- Fixed the issue with connecting to X-600M, allowing users to log in without a username and only with a password.
- Added support for Elliptic Curve Cryptography (ECC) TLS 1.2. MQTT needs that to connect with several commercial brokers.
- The Graph Log File page now displays if there are no log entries instead of showing an error.
- Set the DNS timeout to 10 seconds for direct-connected devices (Ethernet, Wi-Fi) and to 20 seconds for cell retry on DNS.
- `syslogip=0` will turn off logging to the SYSLOG port.