BN880/BC880 Series Interfaces

Thank you for purchasing this Bluebell Opticom professional broadcast video product. The BN880/BC880 Series of interfaces are very simple to install, and this Quick Start Guide should provide sufficient information to get you up and running in the vast majority of cases.

Quick Start Guide

Ref: Bx880 Series QSG issue 1.2_11/23

Overview:

The Bluebell Bx880 range of ST 2110 gateways provide multi-channel conversion between SDI and ST2110 IP. Available in 2 channel 12G-SDI and 4 channel 3G-SDI variants, each channel processes one video, four audio and one ANC data flow. Each audio flow can contain up to 16 audio channels which can be freely re-mapped. All models feature dual 25 Gigabit Ethernet IP media ports (SFP28) with full support of ST 2022-7 hitless redundancy.

The device is configured and controlled through either NMOS or Ember+ protocols, Riedel's MN SET software, or through a published RESTful API to facilitate its integration into third party control systems.

There are two versions, BC880 and BN880, which consists of six variants mentioned below. The BC880 occupies two slots in the BC100i 3RU frame or BC160i 1RU frame which can have network monitoring through a webpage/SNMP via a BM102i monitoring card. For standalone applications, the BN880 version can be used as an individual rugged enclosure.

For simplicity, we will use the term Bx880 when describing both versions.

This Quick Start Guide covers six variants comprising the range:

- Bx880/2T/12G – Dual 12G SDI Encapsulator
- Bx880/2R/12G – Dual 12G SDI Decapsulator
- Bx880/1T/1R/12G – 1x 12G-SDI Encapsulator + 1x 12G-SDI Decapsulator
- Bx880/4T/3G – Quad 3G-SDI Encapsulator
- Bx880/4R/3G – Quad 3G-SDI Decapsulator
- Bx880/2T/2R/3G – 2x 3G-SDI Encapsulator + 2x 3G-SDI Decapsulator

Optional extras:

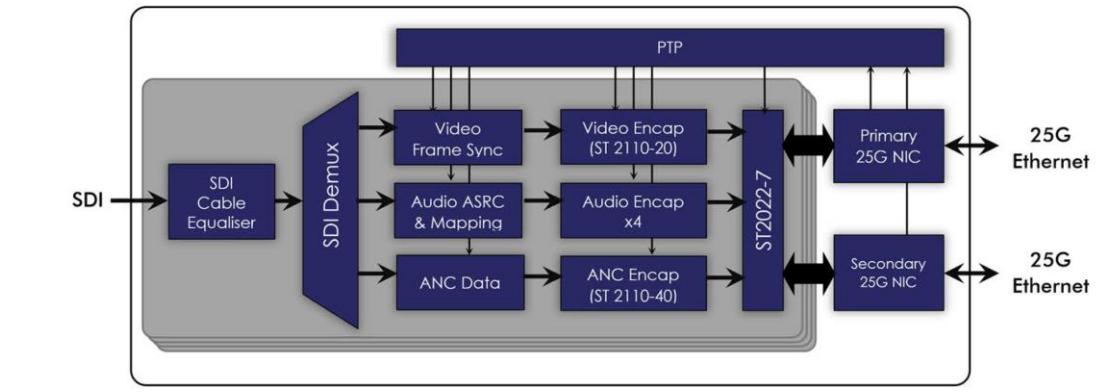
- /GL – PTP Synchronised Genlock output
- /CS – Clean & Quiet Switching (bandwidth limitations apply)
- /EP – Ember+ instead of the default NMOS

The six variants are of identical construction, except for the two channel variants having two BNC connectors and four channel variants having four BNC connectors. The outward appearance differ only in the silk-screened labelling on the interface.

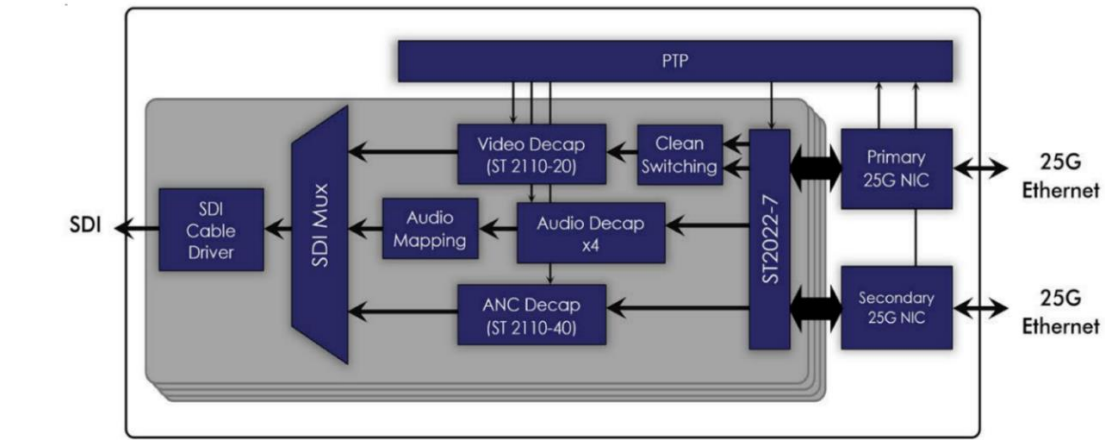
Block diagram

The blocks are repeated for each encapsulator/decapsulator channel.

Encapsulator



Decapsulator



Configure and control

The following software can be used to configure and control the Bx880. Bluebell Opticom is only suggesting the use of any of the third-party software listed below; all support for third-party software is provided by the software creator.

Software	Description	Download Link
Bluebell-Connect	Bluebell's desktop GUI allowing users to configure Bluebell devices.	Contact support@bluebell.tv
MN Set	Embrionix APP configuration software. MN SET is the first step to get the device's APP up and running.	https://www.embrionix.com/product/MN%20SET
Ember+ Viewer*	An Ember+ client that allows you to use Ember+ protocol to configure and control your device's APP.	https://github.com/Lawo/ember-plus/releases
NMOS registry such as Sony nmos-cpp	An NMOS registry is required to use NMOS protocol to control the routing of media streams through your device's APP (as a registration server and connection manager). For APPs that support NMOS only. Another NMOS registry can equally be used	https://github.com/sony/nmos-cpp
Insomnia	REST client for APP configuration. Another REST client can equally be used.	https://insomnia.rest/
iReasoning MIB browser	A MIB browser used to view the contents of an SNMP server. Another MIB browser client can equally be used.	https://www.ireasoning.com/mibbrowser.shtml

* Ember+ support is not a default feature of the Bx880, but as an optional extra, see Overview.

Power

BN880

BN880 requires an external power supply voltage of 8 - 17V DC. A Bluebell Model PS12 PSU (12V) will be packed with the BN880 interfaces if one is ordered. The power supply connector is a Neutrik® XLR4M, and a locking mating connector is pre-fitted to the PS12 DC cable.

Pin	
1	0 V
2	n/c
3	n/c
4	+V DC

If using an alternative PSU,
wire the connector as above.

Model	Typical Power Consumption
BN880/2T/12G	11.0 W (2ch variants)
BN880/2R/12G	
BN880/1T/1R/12G	
BN880/4T/3G	12.0 W (4ch variants)
BN880/4R/3G	
BN880/2T/2R/3G	

The power consumption of the 2ch and 4ch Bx880 variants.
2ch variants are measured with 2x12G SDI signals.
4ch variants are measured with 4x3G SDI signals.

BC880

BC880 draws its power from a 15-slot BC100i or a 6-slot BC160i frame. The 3RU/1RU frame provide enough power to the rack full of BC880s. The module can also be hot-swappable between powered slots and frames.

NOTE: The BC880 occupies two slots of a BC100i and BC160i frame.

Inputs and outputs:

SDI Video:

Bx880 interfaces can be used with serial digital video signals having data rates up to 12 Gb/s. Standards supported are:

- HD-SDI: SMPTE ST292 compliant
- 3G-SDI: SMPTE ST424 compliant
- 6G-SDI: SMPTE ST2081 compliant
- 12G-SDI: SMPTE ST2082 compliant

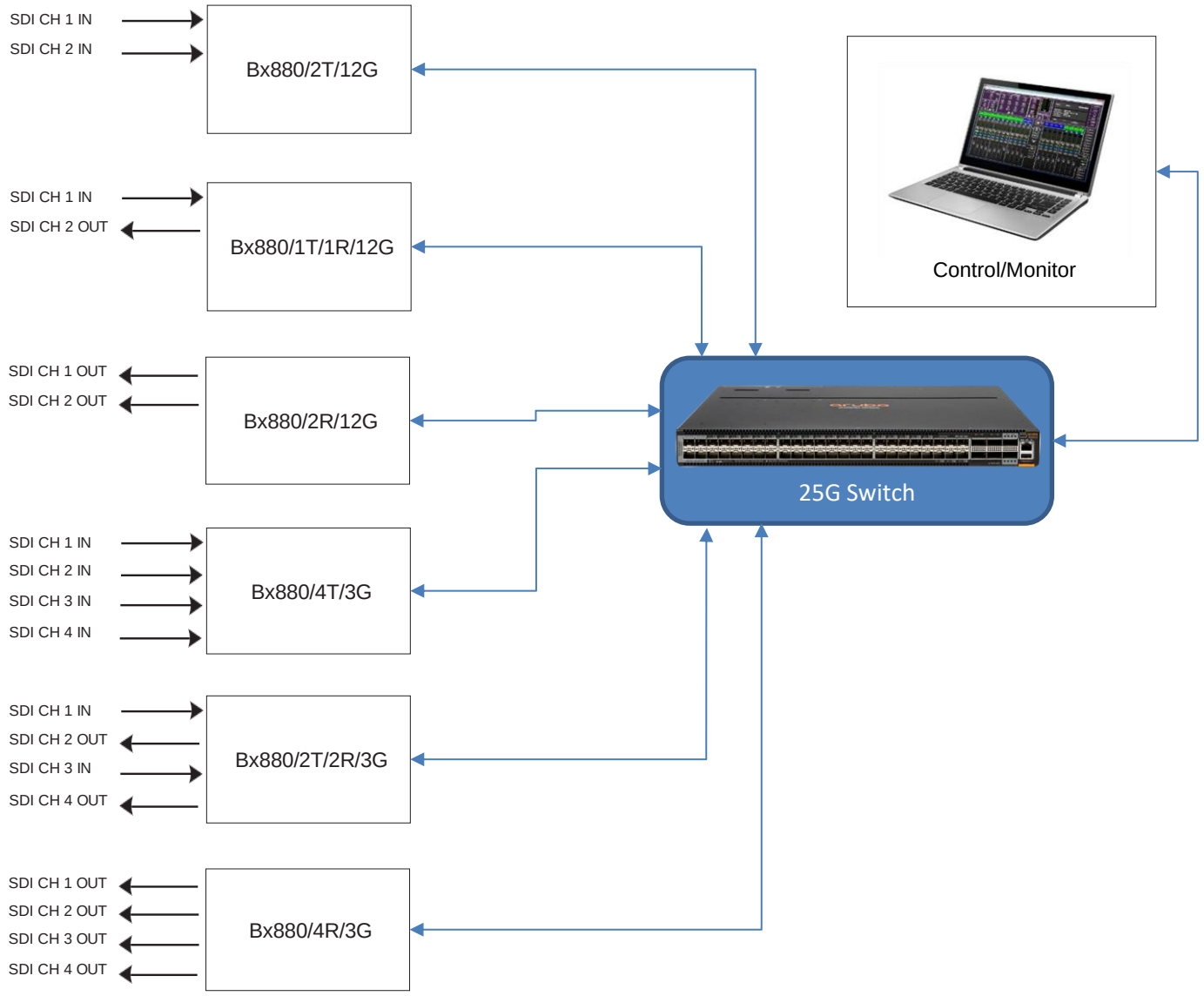
Video inputs and outputs are on 75-ohm BNC sockets. All variants have the following SDI input/output connections on each BNC:

Model	BNC 1	BNC 2	BNC 3	BNC 4
Bx880/2T/12G	I/P	I/P	-	-
Bx880/2R/12G	O/P	O/P	-	-
Bx880/1T/1R/12G	I/P	O/P	-	-
Bx880/4T/3G	I/P	I/P	I/P	I/P
Bx880/4R/3G	O/P	O/P	O/P	O/P
Bx880/2T/2R/3G	I/P	I/P	O/P	O/P

Optical:

Two SFP cages fitted with a dual LC optical module is standard; the module must be a 25 GbE, MSA standard, transceiver. By default, the Bx880s are set to run at 25G, but 10G versions are available if requested when placing an order. For example, a 10G version will be compatible with encapsulating/decapsulating four HD/two 3G signals, but not four 3G/one 12G signals. For higher SDI data rates, 25G version and 25 GbE SFPs must be used.

Overview of units

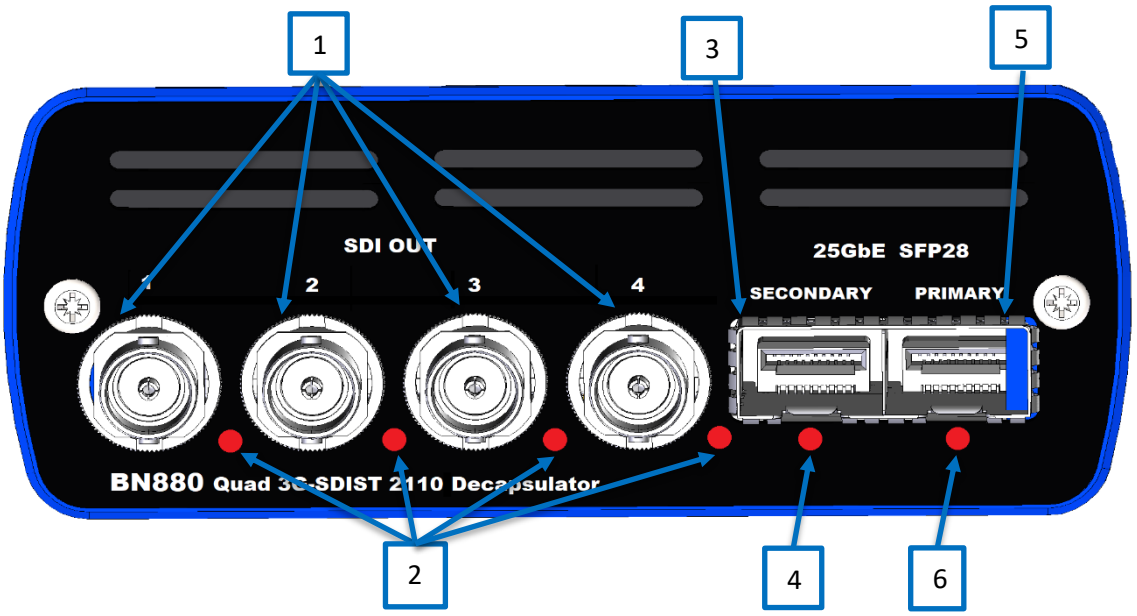


Normally, Bx880 units will be used in a network and will have the video/audio flows configured using a computer. The software used to configure/monitor the flows are managed by the customer, whether it's through NMOS, Ember+, REST API, MN Set, or a customer specific software.

Connections and indicators

On all models, bi-colour LEDs are fitted adjacent to each of the BNC connectors. These illuminate **green** to confirm a valid locked signal (HD/3G/6G/12G SDI), or **red** to indicate either no signal or a signal which is in some way invalid. On an encapsulator channel, the LEDs monitor the incoming SDI video signal, on a decapsulator channel, they confirm the receipt of a valid optical signal.

The LEDs under the SFP cages indicate whether there is a valid link to the switch. Please ensure the correct SFP is used, and the switch's port is configured to the correct settings, i.e., switch port set to 25G, FEC enabled/disabled.



1. **SDI input/output** – 75 ohm BNC socket for SDI input/output connections of channel 1-4. This will be an SDI input if the channel is an encapsulator, SDI out if channel is a decapsulator.
2. **S/L channel status**– bi-colour LED for each channel indicating SDI lock status for Channel 1-4.
3. **Secondary SFP slot** – SFP cage to fit a 25 GbE, MSA standard, data SFP. This provides the Ethernet connectivity to the switch for the secondary interface.
4. **Secondary link status** - bi-colour LED for each channel indicating link-up/down status of the secondary interface between the Bx880 and switch.
5. **Primary SFP slot** – SFP cage to fit a 25 GbE, MSA standard, data SFP. This provides the Ethernet connectivity to the switch for the primary interface.
6. **Primary link status** - bi-colour LED for each channel indicating link-up/down status of the primary interface between the Bx880 and switch.

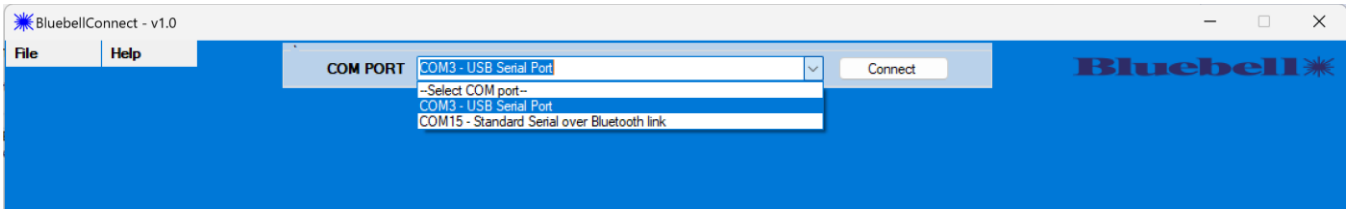
NOTE: Two channel cards have a similar layout but do not include BNC and indicators for channel 3 and channel 4.

BluebellConnect – Configure your Bluebell Device

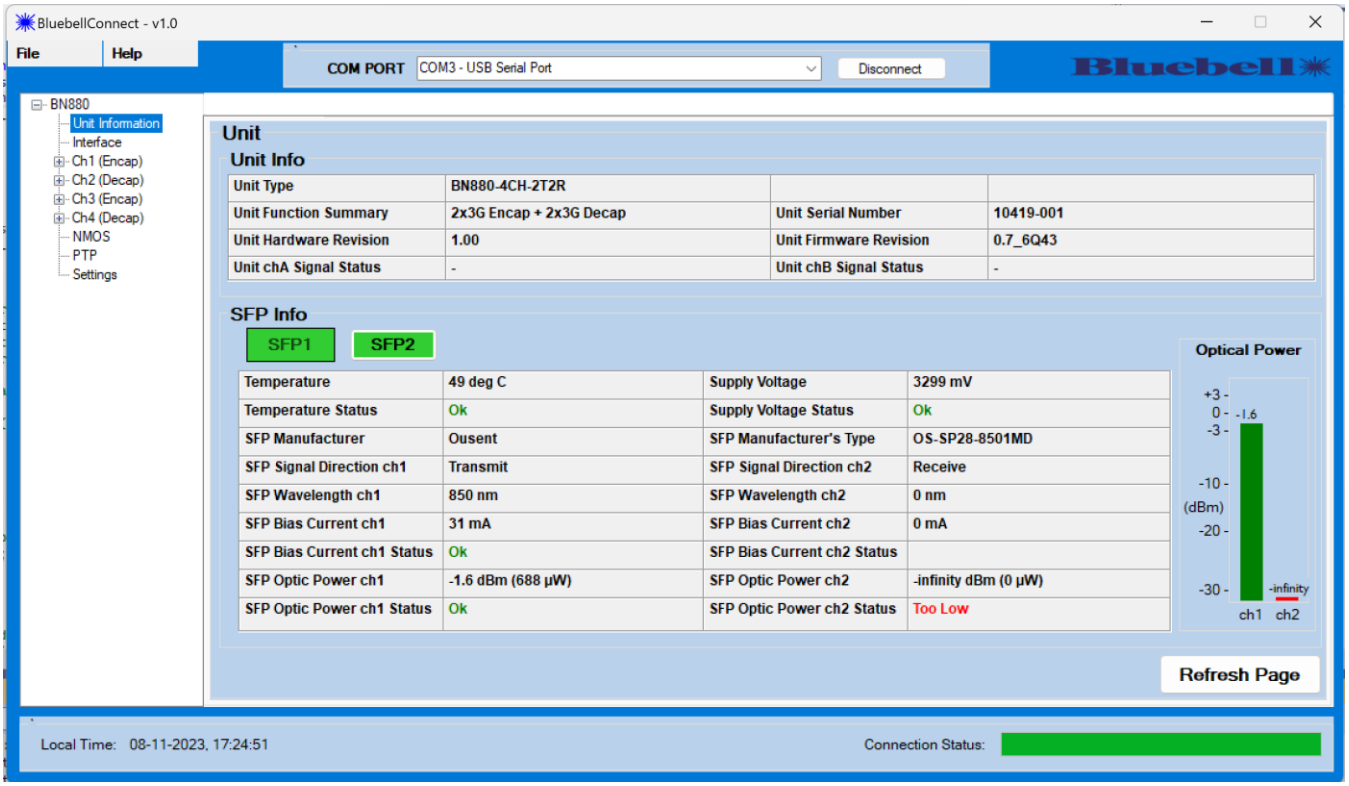
Before connecting the Bx880 to the network, the user can configure the unit's network parameters to work within the network rather than altering the network itself. The intended use of BluebellConnect is not to configure the device during live production, but to help set-up and pre-configure the device before connecting to a network.

To connect a unit to BluebellConnect, simply:

1. Power the Unit
2. Connect a USB from the type-C connector at the rear of the unit to a PC.
3. Open BluebellConnect.exe
4. Once the Bx880's LEDs have stopped toggling green/red, it is ready for a connection.
5. Select the correct COM port for your device, and click "Connect"

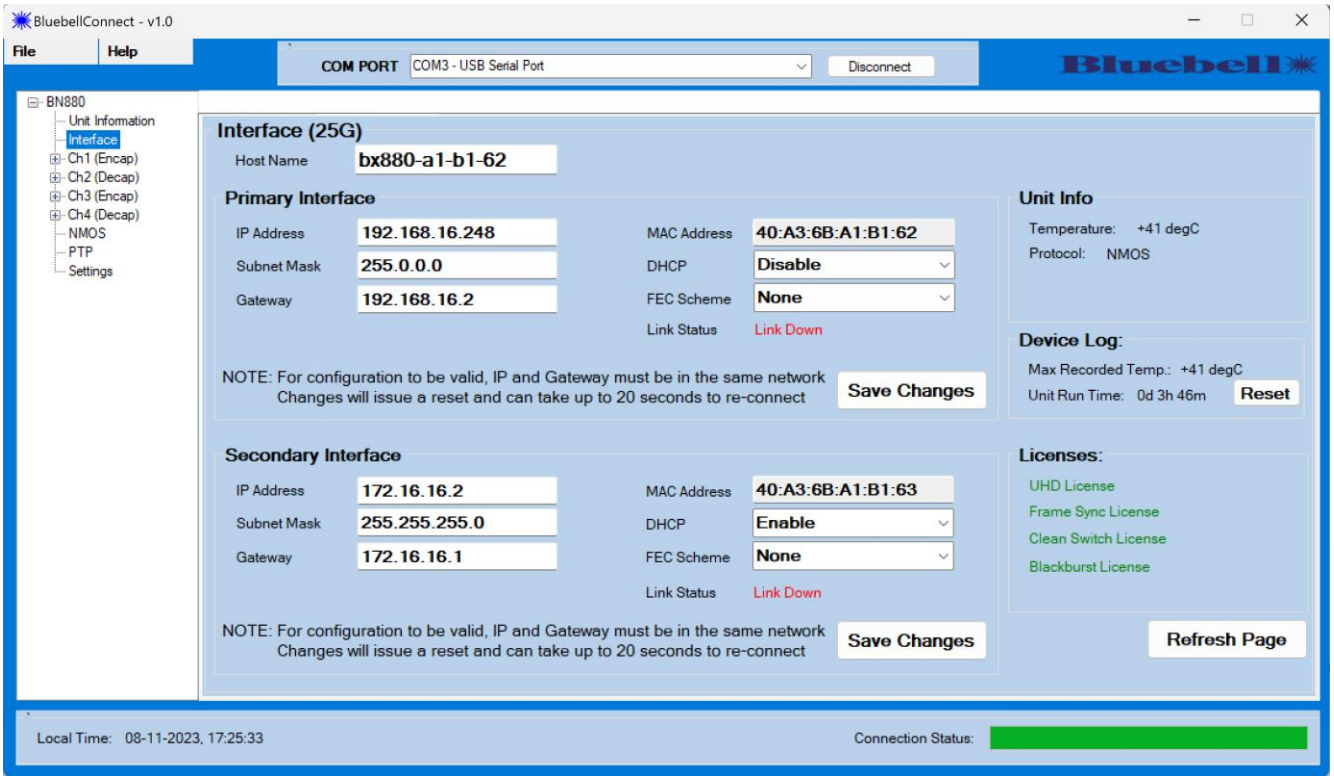


6. Once the unit is detected, the connection status bar at the bottom will turn green and the following will appear.

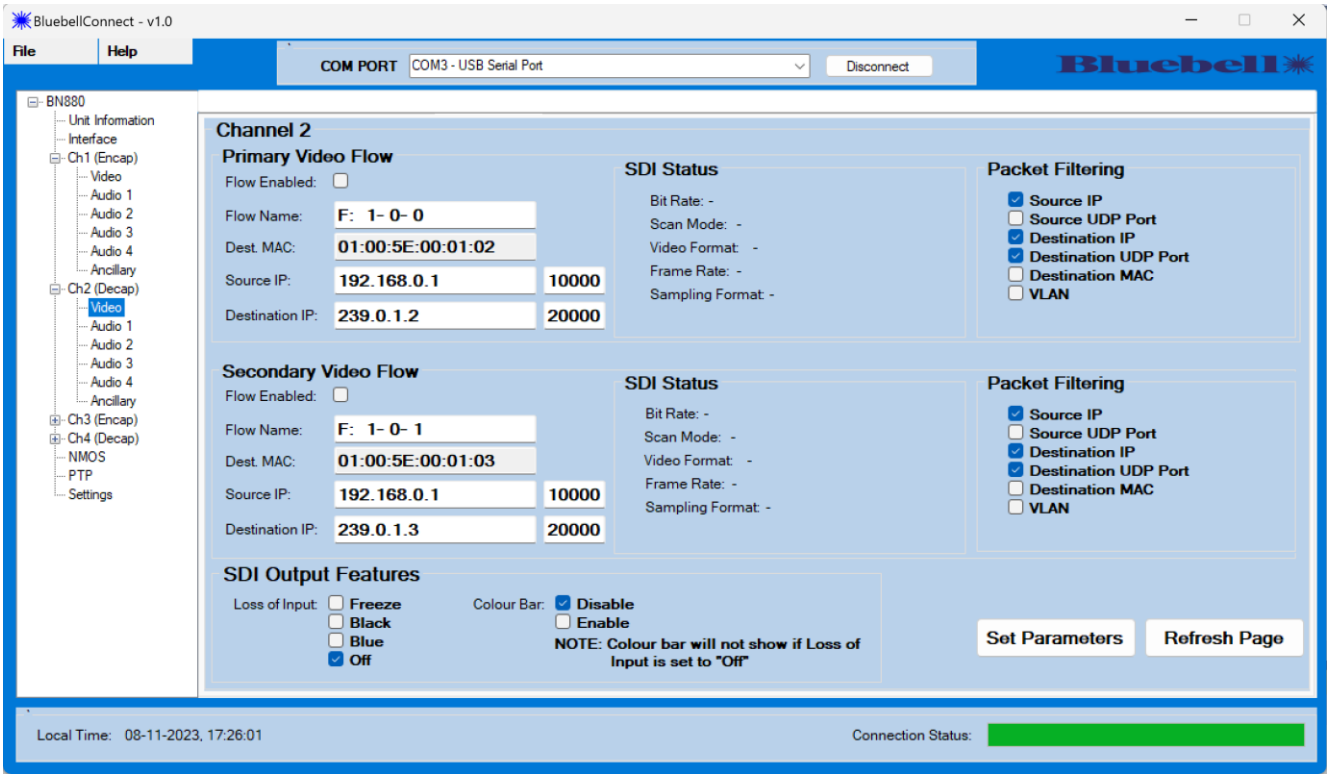


7. The units can be configured as the user desires. Simply make the changes and click "Save Changes" to trigger the change or click "Get Parameters" to refresh all the parameters on the page.
8. Click on Channels, NMOS or PTP settings for further configuration.

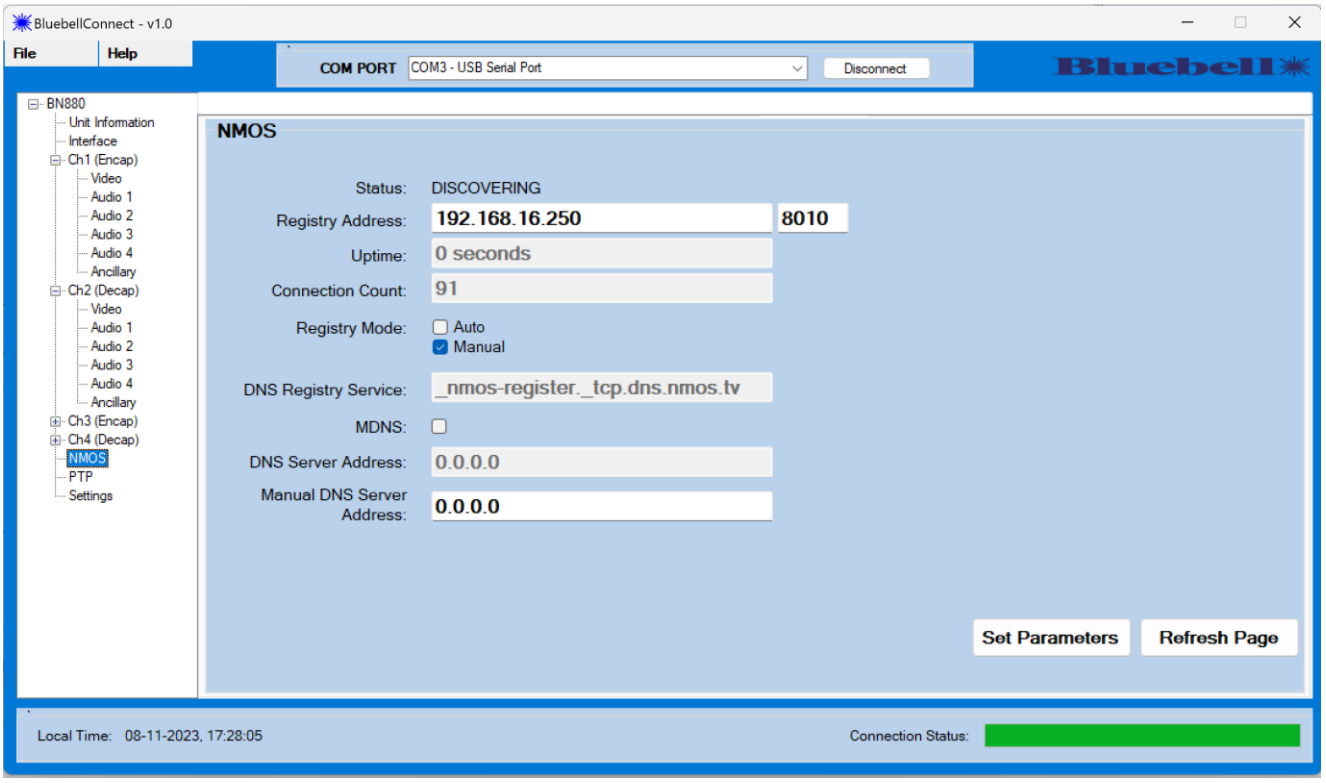
Interface Configuration



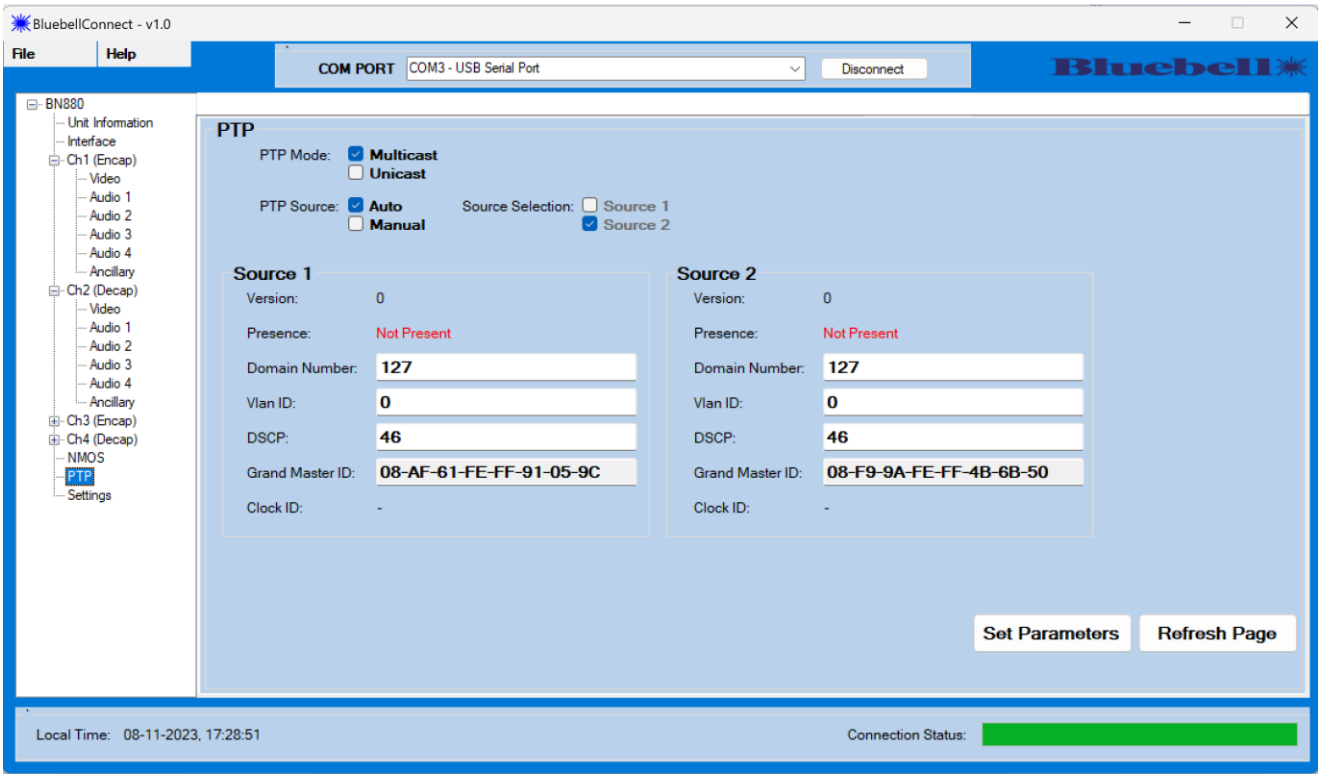
Channel Configuration:



NMOS Configuration



PTP Configuration:



NOTE: The BluebellConnect software may change over time. Please refer to the BluebellConnect documentation for up-to-date user guides and versions.

Factory defaults

There are a few factory default settings customers must be aware of when first setting up a Bx880 to their network.

Host name – Host name is Bx880-xx-yy-zz, where xx-yy-zz is the last three bytes of the device MAC address.

Management IP Address – The management IP address will be in the 10.x.y.z range, which are reserved for private IP addresses. The x.y.z values are derived from the device's MAC address. To determine the management IP address, take the last three bytes of the MAC (e.g. A1:B2:C3) and convert each Hexa-decimal (HEX) to Decimal (DEC). In this case, A1:B2:C3 will convert to 161.178.195, therefore the management IP address would be 10.161.178.195.

NOTE: *The MAC address is factory assigned and cannot be changed.*
If the last byte of the MAC is 0, this field will be changed to a 1 to ensure a valid IP address. For example, if the MAC address is 40:A3:6B:A1:B1:00, the device's IP address will be 10.161.178.1.

Subnet Mask – Subnet mask by default is 255.0.0.0.

Gateway – Gateway by default is xx.160.1.2, where xx is the first value of the IP address, e.g., 10.

DHCP – DHCP is disable.

FEC – FEC is turned off by default, but the device can support Reed Solomon FEC if needed. Please configure the device using Bluebell Opticom's BluebellConnect if you require a Bx880 board with RS-FEC enabled. The device will not communicate with the network interface if FEC settings differ. Ensure the network port's FEC matches the unit's FEC configuration.

SFP data rate – The Bx880 runs the SFPs for enough bandwidth for a dual channel 12G or quad channel 3G. Ensure the network port's speed can handle 25G data transfer.

Frame rate – The frame rate is set to fractional. If using MN Set to configure the device, go to Device -> Ports to configure this as an integer or fractional. Some other third-party software may change this automatically according to input/output signal.

NOTE: For any technical issues not covered in this Quick Start Guide, please contact Bluebell Opticom.

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