ETHERNET/IP

(Arlyn UpScale Touchscreen Display)

EtherNet/IP Compatibility Addendum

(Integrated)



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1 OVERVIEW

1.1 What is EtherNet/IP?

EtherNet/IP (Industrial Protocol) is an industrial network protocol that adapts the Common Industrial Protocol (CIP) to standard Ethernet. It is widely used in various industries, including factories, hybrid systems, and process automation

Being an open standard, EtherNet/IP has sparked the development of a plethora of products by numerous manufacturers, spanning PLCs, PACs, Drives, Robots, Proxies, IOs, and diagnostic tools.

EtherNet/IP facilitates both cyclic and acyclic communication among components, encompassing functionalities like diagnostics, functional safety, alarms, and additional data exchange. This protocol leverages standard Ethernet as its communication medium, with Ethernet cables interconnecting EtherNet/IP components in a network, accommodating the coexistence of various Ethernet protocols within the same infrastructure.

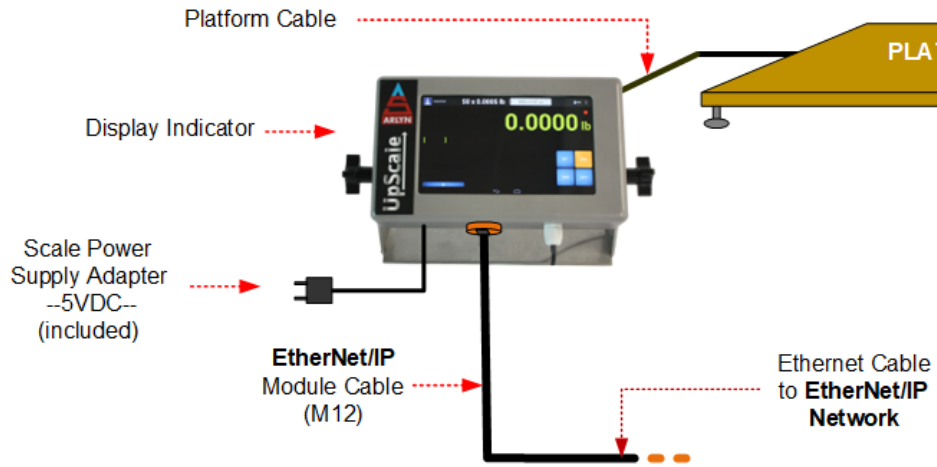
1.2 Purpose of this Document

This addendum will go through the process of setting up your EtherNet/IP add-on to the scale and help you configure the module to fit your network environment.

2 COMPONENT SETUP

2.1 Wiring

EtherNet/IP SETUP w/ ARLYN UPSCALE



Platform Cable – Connects the PLATFORM to the INDICATOR through an M12 Cable.

Indicator & Platform – Components that make up your scale.

Scale Power Supply – Connects the INDICATOR to your power outlet at 5VDC. Supplies power to the Scale (Display & Platform),

EtherNet/IP Connectivity - Connection from the scale indicator (Target) to the EtherNet/IP compatible PLC (Originator).

NOTE: EtherNet/IP configuration (i.e. Static IP assignment) ***follow instructions on the provided EtherNet/IP Addendum for static IP assignments and other details.***

2.2 Guidance

The system is designed in such a way so that it is “plug and play” in terms of wiring. Before connecting the scale to your PLC or HMI to communicate in EtherNet/IP, it must be setup to be recognized by your network. The module only accepts Static IP and it needs to be configured accordingly.

1) Follow the instructions in the Arlyn UpScale QuickStart and the User Manual to set your scale up accordingly.
2) Connect the EtherNet/IP module to the display as shown in the wiring diagram above.
3) Three pathways forward:
    a. The scale is configured for DHCP. Connect the scale to your LAN Network “as is” to obtain the IP address from your network. Similarly connect your PLC to the network. Have the scale communicate through EtherNet/IP
    b. Alternatively, examine operation of the EtherNet/IP on the scale indicator using EIPScan PC Software. Use **“Troubleshooting EtherNet/IP with EIPScanner Utility”** documentation included in your shipment for further details.
    c. You can also set the scale indicator for Static IP for EtherNet/IP communication.

3 SCALE’S ETHERNET/IP SETUP

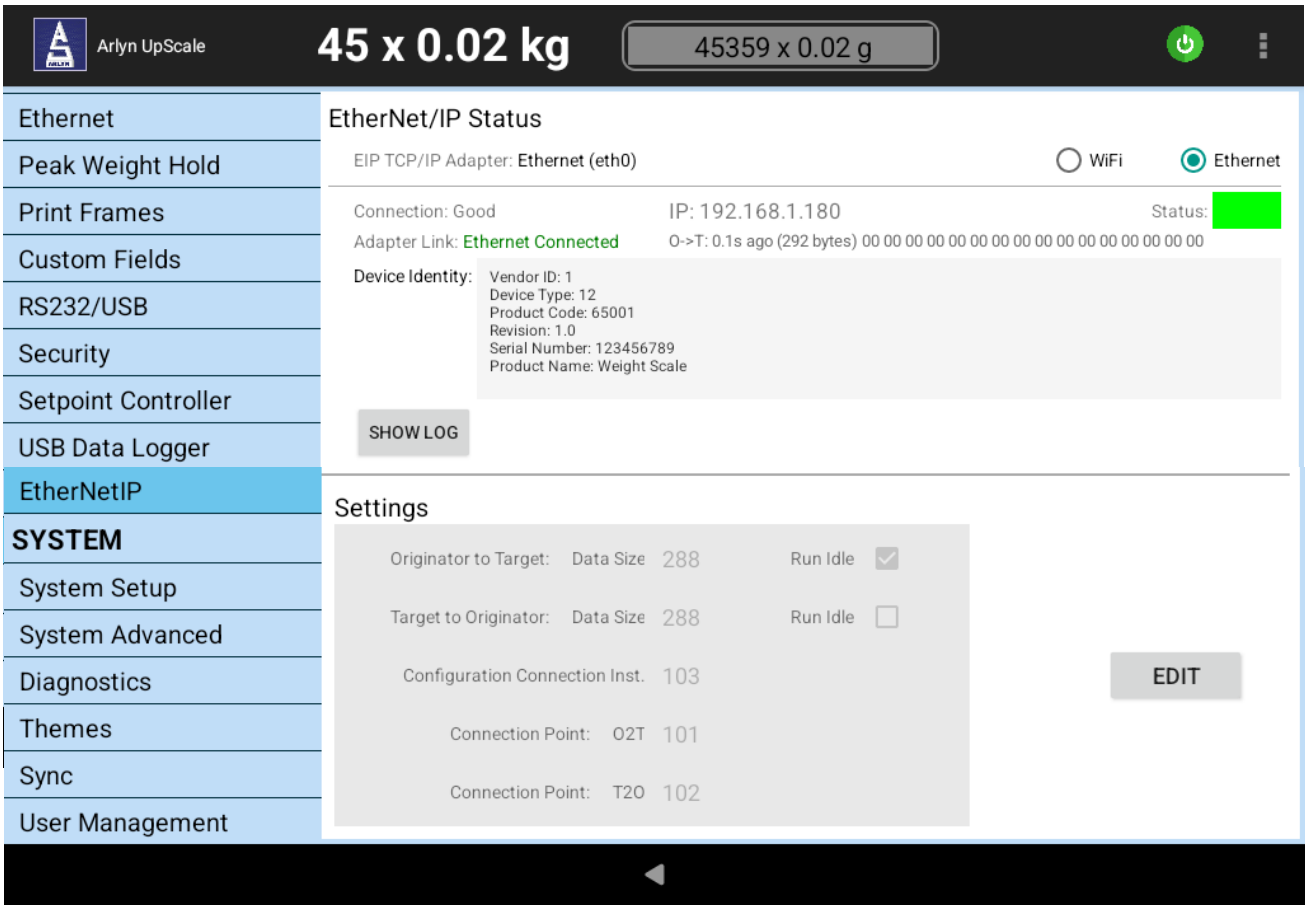
3.1 Setup Screen

The EtherNet/IP settings can be found in the following manner.

a) Tap the ☰ menu icon (top-right of the main screen).

b) Select “Settings” to open the Scale Settings panel.

c) Scroll down and tap **EtherNet/IP** on the blue panel.



The sections below describe each part of the screen and their functions.

3.2 EtherNet/IP Status Block Layout

The status block at the top of the screen is organized as follows:

UI row	Label	Meaning
Adapter	EIP TCP/IP Adapter:	Active interface: Ethernet (eth0) or WiFi (wlan0)
Radios	WiFi / Ethernet	Read-only indicators — not selectable on this screen
Connection	Connection: + status text	EtherNet/IP connection text (e.g. Good, Awaiting scanner I/O)
Connect LED	Status: + colored bar	EtherNet/IP connection color (see §2.3)
Adapter Link	Adapter Link:	TCP/IP link state for the active adapter only
I/O summary	O->T line	Last scanner output received (when Class 1 I/O is active)
IP / MAC	IP: / MAC:	Shown when adapter link is up — use IP for EIPScan Network Path
Device Identity	Vendor ID, Product Code, …	OpENer device identity summary

NOTE: Adapter Link reflects the network layer (WiFi/Ethernet cable). The Connect LED reflects EtherNet/IP stack state and scanner I/O — not merely Internet or adapter link status.

3.3 Connection LED Status Indicator

The colored Connect LED and connection status text indicate EtherNet/IP health:

LED	Condition	Status text
Grey	Adapter link down	WiFi is off / WiFi disconnected / No Ethernet cable
Yellow	Link up, stack running, no O->T yet (≤1.5 s grace)	Awaiting scanner I/O
Green	O->T received within 1.5 s	Good
Red	Issues with I/O Connection	• EtherNet/IP Stack not running • No I/O from Scanner/Originator

When EIPScan Class 1 I/O is connected with matching parameters (see Summarized Parameters), the scale should show Good and an updating O->T summary line.

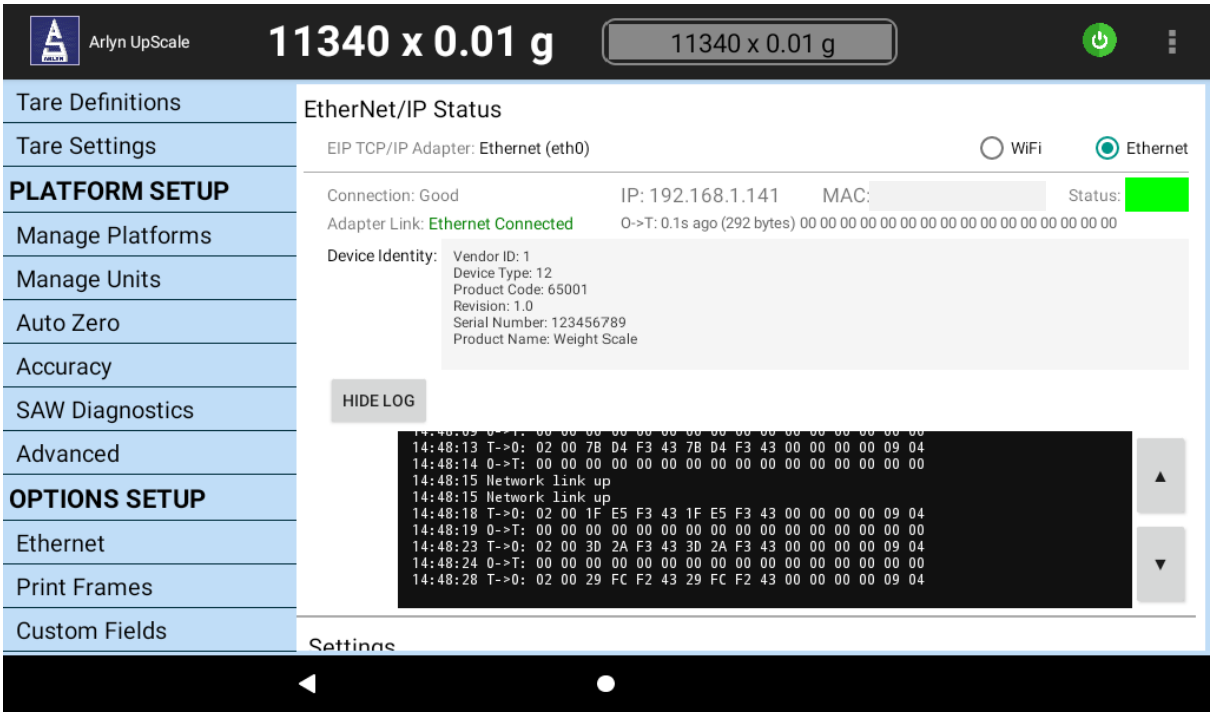
When the adapter link is up but no scanner I/O is present, the LED is briefly yellow (Awaiting scanner I/O, ≤1.5 s grace) and then red (No I/O from scanner) with an *O->T: none yet* showing on the screen. This indicates EIPScan is not connected or the connection points/data sizes do not match

3.4 Connection Log (*Show Log/Hide Log*)

The troubleshooting log is hidden when you first open the screen. Tap ***Show Log*** to expand it; tap ***Hide Log*** to collapse it again.

- Dark monospace text area with ▲ / ▼ scroll buttons on the right
- Tap ▲ or ▼ = scroll one line; hold = continuous fast scroll until release
- Touch scroll on the log text is disabled so the outer settings page still scrolls normally

- New log lines auto-scroll into view only when you are already at the bottom
- The log is in-memory only — it is cleared when the app restarts

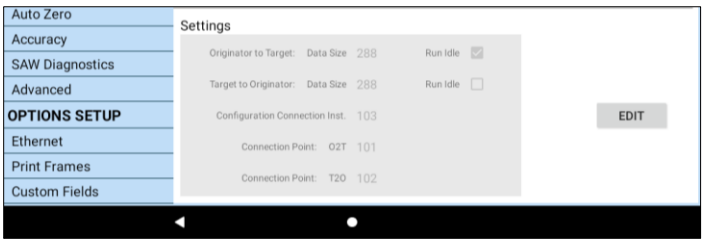


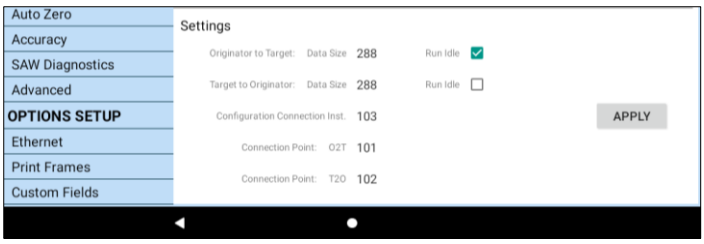
Typical log entries include: TCP/IP adapter selection, network link up/down, stack start, assembly sizes and connection points, connection state changes (Good / Waiting / No I/O), first O->T and T->O traffic, settings applied, and I/O timeout or resume messages.

3.5 EtherNet/IP Parameter Settings – Read-Only (w/ Edit Privileges)

Connection parameters below the status block are read-only (gray background) until you tap ***Edit***. This prevents accidental changes from touch input.

- **Edit** — enables all settings fields and shows Apply
- **Apply** — prompts for confirmation, saves settings, and restarts the EtherNet/IP stack
- Minimum assembly data size is 288 bytes — invalid values are rejected on *Apply*
- If you leave the screen with unsaved edits, the app prompts to *Apply* or *Discard*
- After Apply, reconnect EIPScan Class 1 on the PC to restore “Good” status





3.6 EtherNet/IP Summarized Settings Parameters

Field	Default	Notes
Originator to Target: (O→T) Data Size	288	Command bytes sent to scale from the PLC
O→T Run/Idle Header	✓ Enabled	Must be ON — scale uses this to detect active connection
Target to Originator: (T→O) Data Size	288	Weight data received from scale
T→O Run/Idle Header	Disabled	Leave unchecked
Configuration Connection Inst.	103	Instance number
O→T Connection Point	101	Command assembly
T→O Connection Point	102	Weight data assembly

IMPORTANT:

- The **O→T** Run/Idle header must be enabled. The scale uses the 4-byte header to detect active connections. Without it, output commands will not be processed.
- The Data Size on your PLC **must match** the Data Size on the Scale's EtherNet/IP setting. If they mismatch, the communication will not work.
- Changing Data Size in the Scale may cause unexpected behavior.
- The Connection point configuration on your PLC must match the configuration on the scale

3.7 Connected State

When the connection is established successfully the EIPScan topology view shows the scale node with an active I/O data strip below it.

Verify on the scale (Section 2): the Connect LED should be green (Good) and the O->T I/O summary line should update every few hundred milliseconds. If the scale shows Awaiting scanner I/O while EIPScan reports an active connection, check connection points (101/102/103), data sizes (288/288), and that O->T Run/Idle header is enabled in EIPScan.

4 STATIC IP CONFIGURATION

The Static IP procedure is the same procedure as explained in the Static IP setup in the Arlyn UpScale User Manual in their relevant WiFi and Ethernet sections. For brevity, the static IP setup process will be re-explained below (for Ethernet connection only).

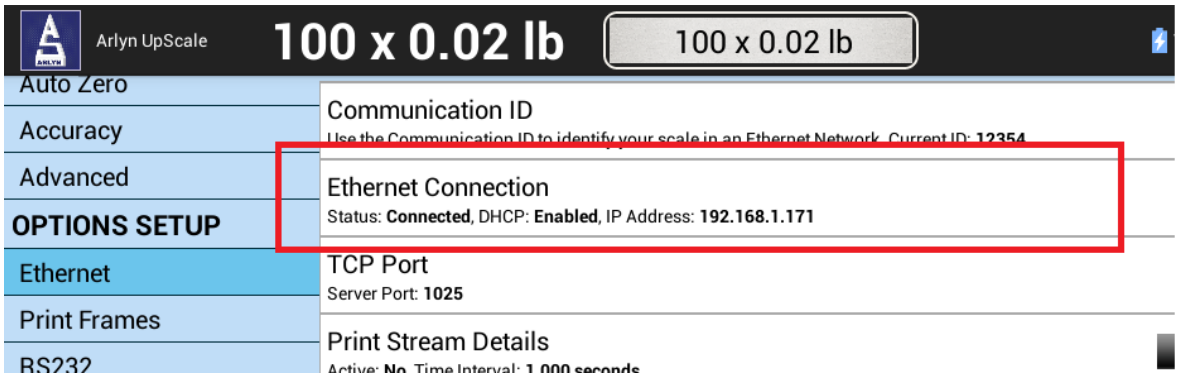
To setup static IP for Ethernet connection:

a) Tap the ☰ menu icon (top-right of the main screen).

b) Select "Settings" to open the Scale Settings panel.

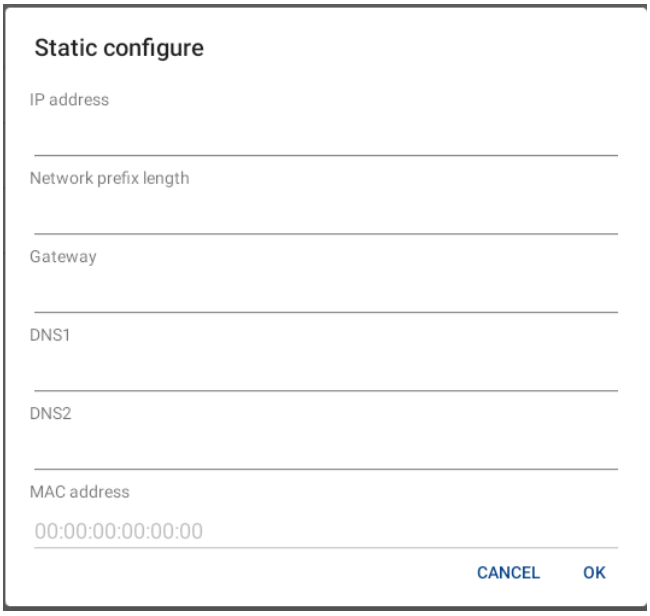
c) Scroll down and tap EtherNet.

d) Tap "Ethernet Connection" to setup Static IP.





e) Select the Statis IP radio button selection. This will enable the static IP textboxes (similar to the one's you see in Windows and other operating systems).



f) Enter the Static IP configuration and press the OK button on the dialog box. Your settings will reflect after 10 seconds. You will see the Ethernet Connection info reflecting the new IP address if it is properly set.

NOTE: The previous method of entering a Subnet Mask (255.255.255.0) has been modernized into **Network Prefix** Length. The default configuration for Mask 255.255.255.0 is now **Network Prefix Length = 24.** Refer to the table below for a general look up of Subnet Mask Network Prefix Lengths.

	Addresses	Hosts	Netmask	Amount of a Class C
/30	4	2	255.255.255.252	1/64
/29	8	6	255.255.255.248	1/32
/28	16	14	255.255.255.240	1/16
/27	32	30	255.255.255.224	1/8
/26	64	62	255.255.255.192	1/4
/25	128	126	255.255.255.128	1/2
/24	256	254	255.255.255.0	1
/23	512	510	255.255.254.0	2
/22	1024	1022	255.255.252.0	4
/21	2048	2046	255.255.248.0	8
/20	4096	4094	255.255.240.0	16
/19	8192	8190	255.255.224.0	32
/18	16384	16382	255.255.192.0	64
/17	32768	32766	255.255.128.0	128
/16	65536	65534	255.255.0.0	256

Credit: https://www.aelius.com/njh/subnet_sheet.html

g) To confirm Static IP address change, go back to the EtherNet/IP Settings to check if the static IP address has reflected properly.

5 TROUBLESHOOTING

Use ***Show Log*** on the scale for connection and stack detail before contacting support.

Item	Symptom	Resolution
1	**Yellow Awaiting scanner I/O, adapter link up**	EIPScan Class 1 is not connected. Add or enable the Class 1 connection. (Verify CP 101/102/103 and data size 288.
2	**Red No I/O from scanner**	EIPScan stopped sending O->T or connection was deleted. Reconnect Class 1 in EIPScan. Check Show Log for I/O timeout entries.
3	**Grey LED + WiFi/Ethernet adapter message**	Fix network link first (enable WiFi, connect to AP, or plug in Ethernet cable) before troubleshooting EIPScan.
4	**Green but commands ignored**	O2T Run/Idle header must be enabled in EIPScan Data Size tab. Clear command byte to 0 before re-sending.
5	**Forward Open fails / connection rejected**	Verify connection points (101/102/103) and data sizes (288/288) match the scale Settings section exactly.

6	**After changing scale settings**	Edit → Apply on the scale restarts the stack. Reconnect EIPScan Class 1; confirm Good and check Show Log for settings-applied entry.
7	**Connection refused on port 44818**	EtherNet/IP option disabled. Enable in Options Setup → EtherNet/IP and confirm adapter link is up.
8	**T2O data shows all zeros**	Connection established but scale is not active. Confirm the scale is displaying weight.
9	**Unit shift changes wrong platform**	Byte 4 shifts the "*OnTop*" (currently selected) platform. Use bytes 11–15 to target a specific platform by index.
10	**Float values incorrect in PLC**	Map to REAL tag — no byte swap needed. Scale uses CIP standard DCBA (Little-Endian) float order.

6 DATA AREAS

Data Areas are regions in the scale with address spaces, each containing specific data to be queried. The scale has 2 data areas

- Input Buffer (Address Region 0) [Read Only]
- Output Command Buffer (Address Region 0) [Write Only]

The Data areas outlined below only show a snapshot for a single platform scale without options. A detailed data mapping for EtherNet/IP is available on Google Sheets: http://bit.ly/ArlynScalesEtherNetIP

6.1 EtherNet/IP Input Buffer [Data Read] (T2O)

OFFSET (Hex)	OFFSET (Dec)	ITEM	TYPE	DESCRIPTION
0x0000	0	Unit (Top Platform)	UINT8	Unit code
0x0001	1	[RESERVED]	UINT8	Always 0
0x0002-0x0003	2-3	Gross Weight [low WORD]	UINT16 LE	Low 16 bits of IEEE-754 float
0x0004-0x0005	4-5	Gross Weight [high WORD]	UINT16 LE	High 16 bits of IEEE-754 float
0x0006-0x0007	6-7	Net Weight [low WORD]	UINT16 LE	
0x0008-0x0009	8-9	Net Weight [high WORD]	UINT16 LE	
0x000A-0x000B	10-11	Tare Weight [low WORD]	UINT16 LE	
0x000C-0x000D	12-13	Tare Weight [high WORD]	UINT16 LE	
0x000E-0x000F	14-15	Status 1 (Top Platform)	UINT16 LE	16-bit weight status
0x0010-0x0011	16-17	Displayed Value [low WORD]	UINT16 LE	
0x0012-0x0013	18-19	Displayed Value [high WORD]	UINT16 LE	
0x0014-0x0015	20-21	Status 2 (GLOBAL)	UINT16 LE	Setpoints + HI/OK/LO
0x0016-0x001C	22-28	[RESERVED]	-	Always 0
0x001D	29	Parts Counting Active (On Top)	UINT8	0=Off 1=On (active + sample loaded)
0x001E	30	Front Panel Screen Type	UINT8	0=Single 1=Scoreboard 2=Multi-Platform 3=Diff/Total
0x001F	31	Current Platform Number (On Top)	UINT8	0-5 -> Platform 1-6

6.2 EtherNet/IP Output Buffer [Commands] (O2T)

BYTE	OFFSET (Dec)	COMMAND	DESCRIPTION
0x0000	0	Zero	Auto-zero the “On Top” platform
0x0001	1	[RESERVED]	Do not use [Write 0]
0x0002	2	Tare	Tare the “On Top” platform
0x0003	3	Tare Long Press	Clear accumulated tare
0x0004	4	Unit Shift (“On Top”)	Shift unit on whichever platform is currently selected
0x0005	5	Net / Gross	Toggle Net / Gross display
0x0006	6	Cycle / Setpoint	Toggle cycle or setpoint function
0x0007	7	Avg Weight & Hold	Toggle average weight / hold
0x0008	8	Flow Rate	Toggle flow rate (when enabled)
0x0009	9	Log Weight	Log current weight reading
0x000A	10	Print (*P)	Send print command
0x000B	11	[RESERVED]	Do not use [Write 0]
0x000C – 0x001F	12–31	[RESERVED]	Do not use [Write 0]
0x0020 - 0x00FF	32–255	(per-platform blocks)	Bytes 32–255 are 8 more command blocks (32 bytes each) for Totals, Platform 0–5, and Compat. Each block uses the same byte offsets (+0x00–+0x0A) as Block 0. NOTE: platform-targeted commands (Unit, Zero, Tare) only execute if that platform is currently displayed (“On Top”).
0x100–0x11F	256-287	P0 Compat	Platform 0 compatibility block

6.3 Status Bit References

6.3.1 Status 1 [UINT16]

BIT	MASK	DESCRIPTION
0	0x0001	OK Indicator – set when no motion AND no overload
1	0x0002	Net Center of Zero (ZR_Net) – zero-range in net mode
2	0x0004	Gross Center of Zero (ZR_Gross) – zero-range in gross mode
3	0x0008	Net Display (NetMode) – net display is active
4	0x0010	Gross Display (GrossMode) – gross display is active
5–9	0x0020–0x0200	Reserved
10	0x0400	No Motion – no motion detected (cleared when in motion)
11	0x0800	Stable – reading is fully stable
12	0x1000	Overload – weight exceeds capacity
13	0x2000	Weighing Failure – load cell / weight failure detected
14–15	0x4000–0x8000	Reserved

6.3.2 Status 2 [UINT16]

BIT	MASK	DESCRIPTION
0–7	0x0001–0x0080	Setpoints 1–8 – active setpoints output
8	0x0100	HI Output – weight above hi setpoint
9	0x0200	OK Output – weight within OK band
10	0x0400	LO Output – weight below lo setpoint
11–15	0x0800–0x8000	Reserved