

NEXUS I016
INPUT/OUTPUT EXPANDER
16 CHANNEL

QUICK START GUIDE

PRODUCT OVERVIEW

Congratulations on purchasing the Nexus IO16 16-Channel Input and Output Expander. This Haltech CAN device expands the functionality of a Haltech Nexus or Elite ECU by adding 16 user-configurable input and output channels, accessible through the Haltech CAN system.



Features

- 6 x Analog Voltage Inputs (AVI)
- 4 x Synchronized Pulsed Inputs (SPI)
- 6 x Half Bridge Outputs (HBO)
- 34-pin AMP Superseal connector
- Slim and compact design
- Can be purchased with either a plug and pins set or a 2.6m universal harness
- Maximum of two Nexus IO16s can be connected to each ECU

What's in the box?

- HT-196000 Nexus IO16
- Quick Start Guide

Optional accessories

- HT-131001 - Plug and Pins set
- HT-180000 - IO16 Universal Wire In Harness 2.6m (8.5')

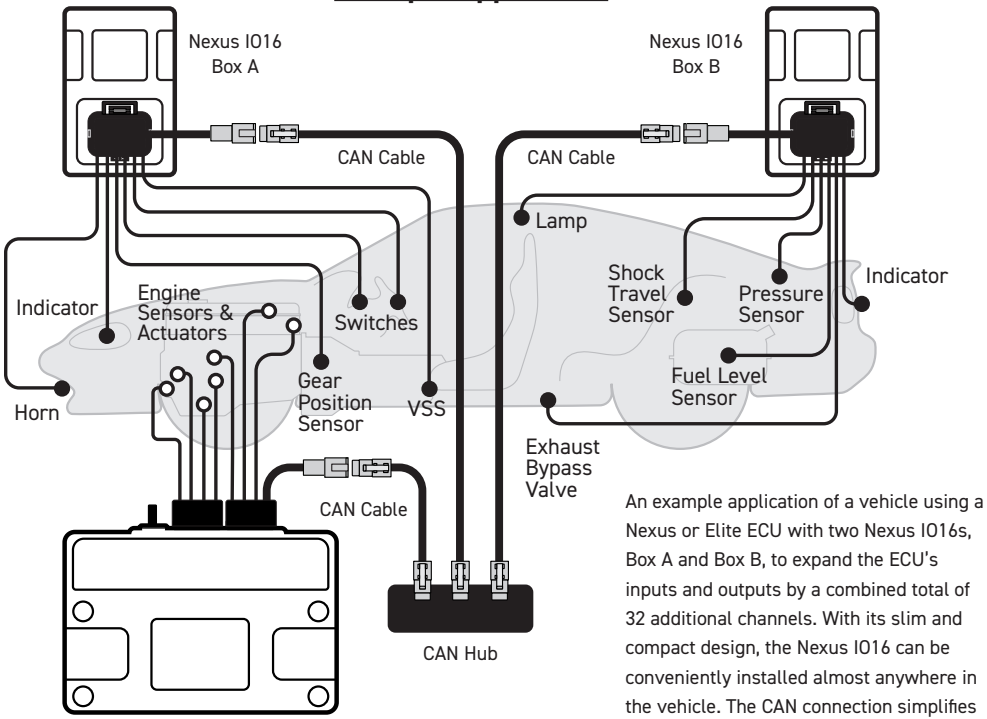


HT-131001



HT-180000

Example Application

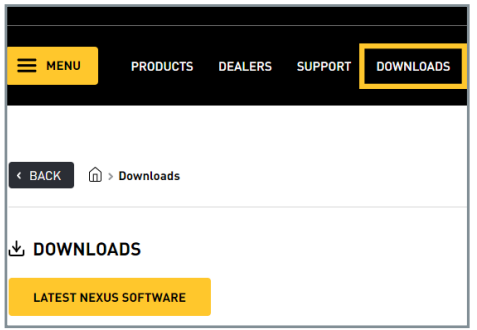


An example application of a vehicle using a Nexus or Elite ECU with two Nexus IO16s, Box A and Box B, to expand the ECU's inputs and outputs by a combined total of 32 additional channels. With its slim and compact design, the Nexus IO16 can be conveniently installed almost anywhere in the vehicle. The CAN connection simplifies wiring, eliminating the need for the IO16 to be installed or wired near the ECU.

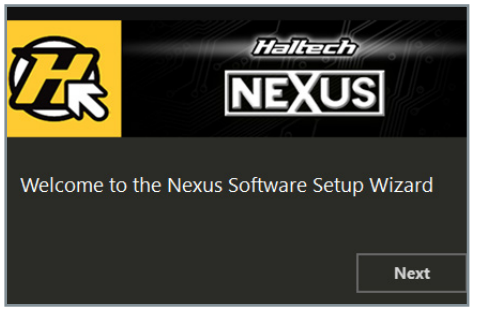
Installing the NSP software

Haltech NSP (Nexus Software Programmer) is the software used to set up the Nexus IO16. Follow these steps to install the Haltech NSP software into your computer if you don't have it already:

1. Download the NSP installer - Go to the Haltech website (haltech.com), navigate to the 'Downloads' section, and click on the download link.



2. Run the installer file - Once the download is complete, locate the downloaded file (usually in the 'Downloads' folder of your computer) and double-click on the file to run the Nexus Software Setup Wizard.



3. Launch Haltech NSP - Once the installation is complete, you can launch the Haltech NSP software from the Windows 'Start' menu or using the desktop shortcut that was created.

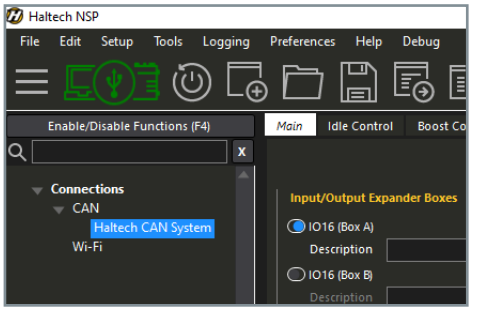


Going online with the Nexus IO16

To go online with the Nexus IO16, connect your Haltech Nexus or Elite ECU to the NSP software and access the IO16 settings within the ECU configuration.

Note: Ensure your NSP software and ECU firmware are up to date or meet the minimum required versions listed below.

NSP: version 1.40.x or later
Nexus firmware: 1.29.x or later
Elite firmware: 3.13.x or later



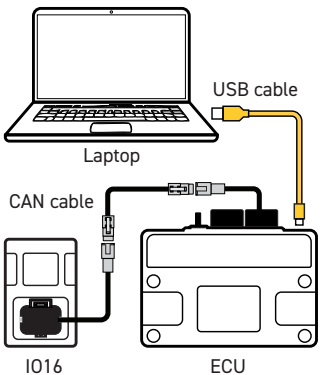
1. Connect your ECU to NSP and enable the Nexus IO16

Use the supplied USB cable to connect your ECU to NSP. In the navigation tree on the left pane, go to **Connections > CAN > Haltech CAN System,** and enable **"IO16"** under Input/Output Expander Boxes.

2. Plug the Nexus IO16 into the Haltech CAN System

Use a Male DTM-4 to Male DTM-4 Haltech CAN cable to connect the Nexus IO16 to the Haltech CAN System. You can connect it directly to the ECU or via a Haltech CAN hub if you are already using multiple Haltech CAN devices.

Ensure that you connect to a CAN port assigned to the Haltech CAN System, as most Haltech ECUs have multiple CAN channels, with one channel potentially assigned to work with a non-Haltech device (e.g., OBD-II, or a vehicle-specific CAN system).

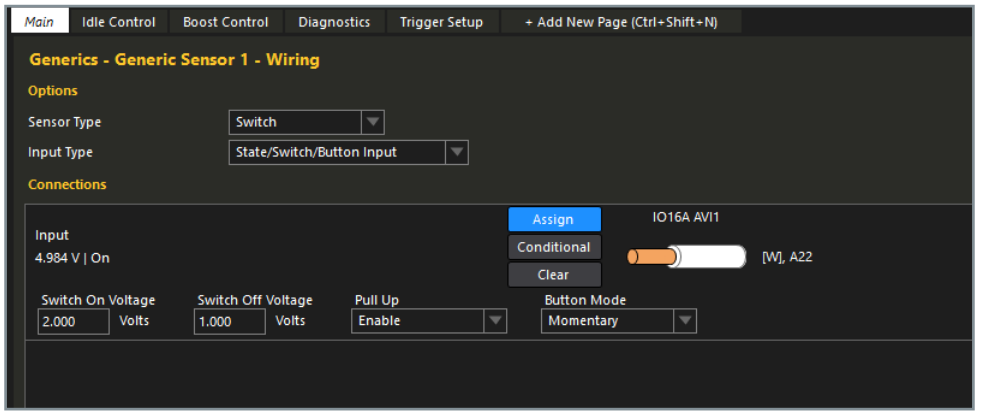


3. Start using the additional inputs and outputs

At this stage, with the Nexus IO16 and ECU powered on with 12V (i.e., Ignition Key On), the Nexus IO16 should appear as "Connected" within the NSP software, with its inputs and outputs available in the NSP IO report.

Assigning the Nexus IO16 inputs and outputs to functions within the ECU is done in the same way as assigning the ECU's own inputs and outputs.



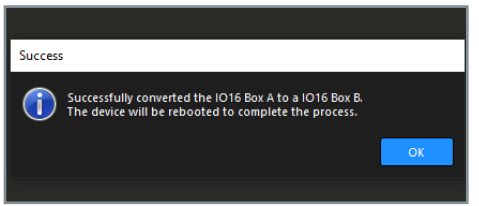


Changing Device IDs

If you are using two Nexus IO16s within the Haltech CAN system, the second IO16 will need its Device ID changed (e.g., from Box A to Box B). This is required so the ECU can differentiate between the available IO16 channels and assign each channel a specific CAN ID.

To change the Device ID, leave only one Nexus IO16 plugged into the CAN system—the one whose Device ID you wish to change. Navigate to the main IO16 page within the NSP software, then click on "Change ID of Device," as shown on page 6.

The process is straightforward, and NSP will configure the device for you. When the process is complete, NSP will display a message (as shown below) and require you to reboot both the ECU and Nexus IO16. You can choose to do this using the reboot button in the software or cycle the power off and on using the ignition key switch.



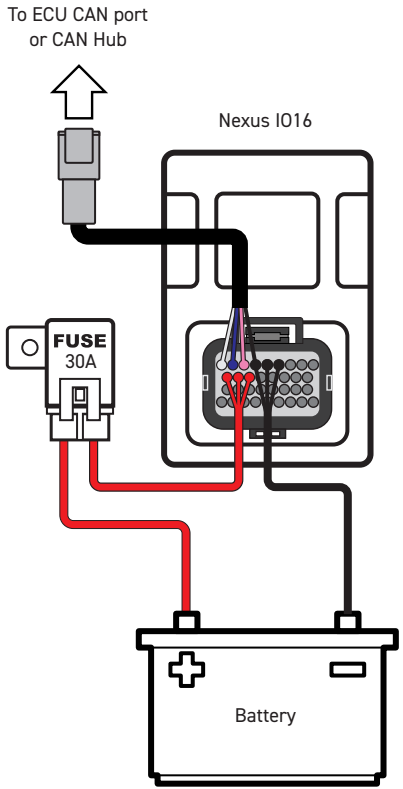


Power and Ground Connections

To fully utilize the Nexus IO16's functionality, the unit must be wired to a fused (30A) constant battery power and battery ground. This connection provides the necessary current for all the Half Bridge Outputs (HBO) when driven high or low.

Switching the Nexus IO16 is managed through the CAN connection by plugging the unit into the Haltech CAN system, either directly into a Haltech Nexus or Elite ECU or an available port on a Haltech CAN hub. This connection controls the Nexus IO16, switching it ON or OFF whenever the CAN system is powered.

Alternatively, the Nexus IO16 can be powered and switched solely through the CAN connector by plugging into the CAN system. This method is less preferred and will limit the current available to the unit. Use this approach only if you are utilizing the inputs (AVIs or SPIs) and your application does not require the use of the Half Bridge Outputs.





Nexus IO16 connector
AMP 34-pin Keyway 2
Wire side view

PIN	FUNCTION
1	CAN High
2	CAN Low
3	CAN Power (12V switched)
4	Power ground
5	Power ground
6	Power ground
7	HBO 1
8	HBO 2
9	HBO 3
10	Constant 12V
11	Constant 12V
12	Constant 12V
13	5V Sensor power
14	5V Sensor power
15	5V Sensor power
16	AVI 5
17	AVI 6

PIN	FUNCTION
18	SPI 1
19	SPI 2
20	SPI 3
21	SPI 4
22	AVI 1
23	AVI 2
24	AVI 3
25	AVI 4
26	Sensor ground
27	Sensor ground
28	Sensor ground
29	Sensor ground
30	No connection
31	No connection
32	HBO 4
33	HBO 5
34	HBO 6

5V Sensor Power and Sensor Ground

The Nexus I016 features multiple pins for a regulated 5V sensor power supply, designed to power typical 3-pin analog voltage devices such as MAP sensors, pressure sensors, position sensors, and rotary trim switches. Similarly, the Nexus I016 features multiple sensor ground pins for earthing sensors wired directly to the Nexus I016.

Any 5V pin can be paired with any sensor ground pin when wiring sensors connected to the Nexus I016.

NOTE: To avoid potential ground loop issues, do not connect the signal ground wires between the Nexus I016 and the ECU, nor connect the signal ground to the power ground.

Analog Voltage Inputs

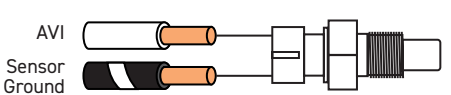
Analog Voltage Inputs (AVI) serve as input channels capable of reading variable 0 to 5V signals from sensors that measure pressure, temperature, or position.

Additionally, these inputs can also accept switched signals that change between two different voltage levels. The "On" voltage and "Off" voltage in the software settings define the thresholds between the "On" and "Off" states. The current AVI voltage can also be viewed as a channel in NSP to determine the thresholds for switched inputs.

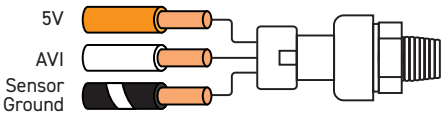
AVIs feature a software-selectable 1K pull-up resistor to 5V, which can be enabled within the NSP software when configuring two-pin temperature sensors or switch-to-ground inputs.

Specs:

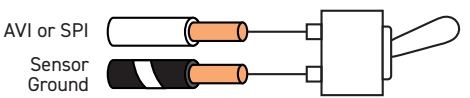
- Number of channels: 6
- 0 to 5V readable range
- Selectable 1k pull-up resistor to 5V
- -10V to 30V indefinite withstand
- 100 samples per second
- 1.5kHz signal frequency max



Example of wiring a temperature sensor with internal pull-up enabled.



Example of wiring a pressure sensor using the 5V supply and internal pull-up disabled.



Example of wiring a ground-triggered SPST switch with internal pull-up enabled.

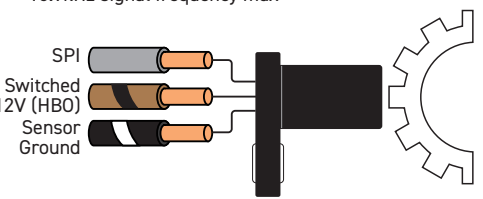


Synchronized Pulsed Inputs

Synchronized Pulsed Inputs (SPI) are inputs that can measure the frequency and duty cycle of a signal. Like AVIs, they can also read 0 to 5V signals from analog voltage sensors. These inputs are suitable for various sensors, including flex-fuel composition sensors, Hall effect or reluctor vehicle speed sensors, and driveshaft speed sensors.

Specs:

- Number of channels: 4
- 0 to 12V digital input
- 0 to 5V analog input
- Selectable 1k pull-up resistor to 5V
- -15V to 30V indefinite withstand
- 15.9kHz signal frequency max



Example of wiring a Hall Effect sensor using an SPI and a Half Bridge Output as a switched 12V supply.

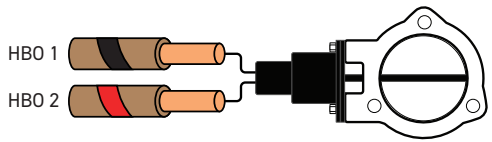
Half Bridge Outputs

Half Bridge Outputs (HBO) function as push-pull, Pulse Width Modulated (PWM) channels suitable for controlling stepper motors, DC motors, or simple switch-to-ground control. HBOs can also provide +12V power to high-side driven devices, such as 12V-switched automatic transmission solenoids, or function as power distribution outputs to supply 12V to various circuits in the vehicle.

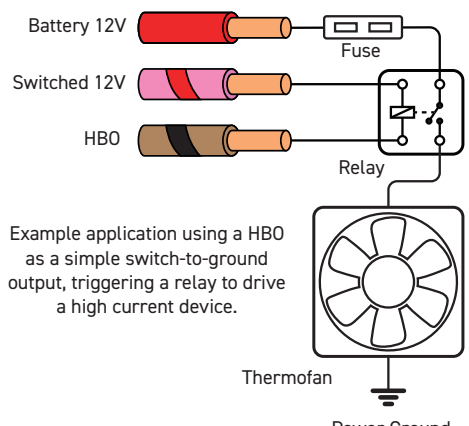
Specs:

- Number of channels: 6
- 8A current (sink / source)
- Overcurrent and overtemperature protection
- 0 to 27V voltage feedback
- High side current feedback
- Capable of 0-100% duty cycle
- 2.2kHz switching speed

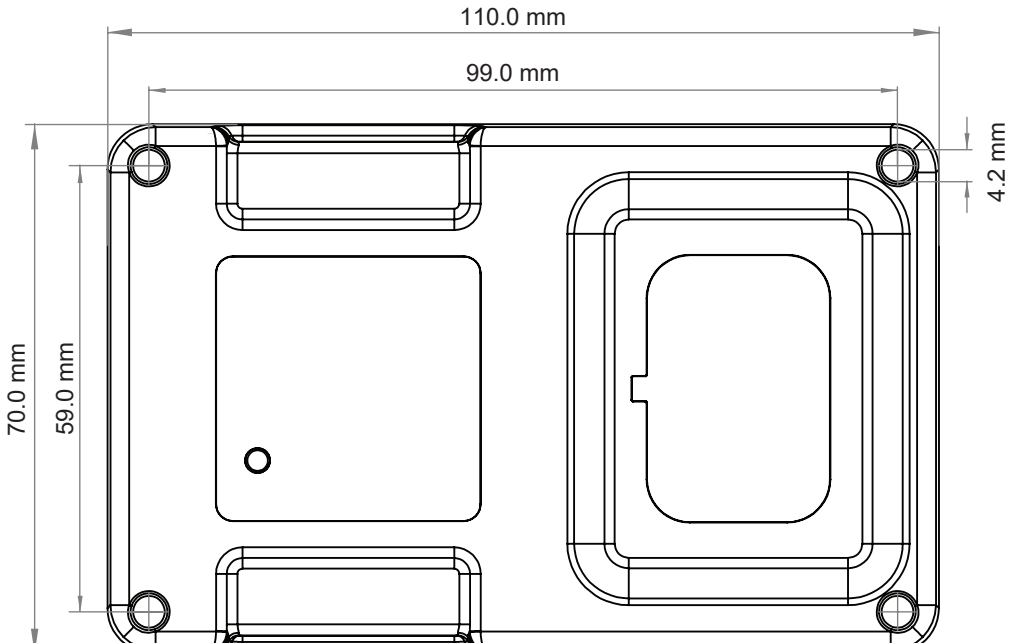
WARNING! When using HBOs, ensure the Nexus I016 is powered using the constant power and battery ground wires as described on page 8.



Example application using two HBOs to control an exhaust bypass valve. Any two HBOs can be paired together in NSP when using them as push-pull outputs.



Example application using a HBO as a simple switch-to-ground output, triggering a relay to drive a high current device.



SPECIFICATION	DETAILS
Product Name	Nexus IO16 Input / Output Expander 16 Channel
Supported ECUs	Elite Series ECUs Nexus Series ECUs and VCUs
Connector	34 Pin AMP Superseal (Type 2 keyway)
LED Indicator	1 x Status LED Green (Normal operation) Orange (Boot mode)
Communications	CAN (Haltech Protocol)
Operating Voltage	8.0V to 22.0V
Ambient Temperature	105°C / 221°F (Max)
Dimensions	70mm x 110mm x 34mm
IP Rating	IP66
Inputs and Outputs	6 x Analog Voltage Inputs (AVI) 4 x Synchronized Pulsed Inputs (SPI) 6 x Half Bridge Outputs (HBO)

WARRANTY CERTIFICATE

At Haltech we make every effort to design and manufacture fault-free products that perform up to or above the market expectations. All our products are covered by a Limited 12 Month Warranty.

Haltech Limited Warranty

Unless specified otherwise, Haltech warrants its products to be free from defects in material or workmanship for a period of 12 months from the date of purchase.

If the Haltech product is found to be defective as mentioned above, it will be replaced or repaired if returned prepaid along with proof of purchase. Proof of purchase in the form of a copy of the original purchase invoice, receipt or bill of sale which indicates that the product is within the warranty period, must be presented to obtain warranty service.

Replacement or repair of a defective product shall constitute the sole liability of Haltech. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations, either expressed or implied, including any implied warranty of merchantability or fitness. In no event shall Haltech, be liable for special or consequential damages.

Product Returns

Please include a copy of the original purchase invoice, receipt or bill of sale along with the unused, undamaged product and its original packaging. Any product returned with missing accessory items or packaging will incur extra charges to return the item to a re-saleable condition.

All product returns must be sent via a freight method with adequate tracking, insurance and proof of delivery services. Haltech will not be held responsible for product returns lost during transit.

Returns of Products Supplied in Sealed Packaging

The sale of any sensor or accessory supplied in sealed packaging is strictly non-refundable if the sealed packaging has been opened or tampered with. This will be clearly noted on the product packaging. If you do not accept these terms please return the sensor in its original unopened packaging within 30 days for a full refund.

A sensor or accessory product may be returned after 30 days of purchase (with its sealed packaging in tact) for credit only (no refunds given) and will be subject to a 10% restocking fee.

Installation of Haltech Products

No responsibility whatsoever is accepted by Haltech for the fitment of Haltech Products. The onus is clearly on the installer to ensure that both their knowledge and the parts selected are correct for that particular application. Any damage to parts or consequential damage or costs resulting from the incorrect installation of Haltech products are totally the responsibility of the installer.

Always disconnect the battery when doing electrical work on your vehicle. Avoid sparks, open flames or use of electrical devices near flammable substances. Do not run the engine with a battery charger connected as this could damage the ECU and other electrical equipment.

Do not overcharge the battery or reverse the polarity of the battery or any charging unit. Disconnect the Haltech ECU from the electrical system whenever doing any welding on the vehicle by unplugging the wiring harness connector from the ECU.

After completing the ECU installation, make sure there is no wiring left un-insulated. Uninsulated wiring can cause sparks, short circuits and in some cases fire. Before attempting to run the engine ensure there are no leaks in the fuel system. All fuel system components and wiring should be mounted away from heat sources, shielded if necessary and well ventilated. Always ensure that you follow workshop safety procedures. If you're working underneath a jacked-up car, always use safety stands!

Haltech Off-Road Usage Policy

In many states it is unlawful to tamper with your vehicle's emissions equipment. Haltech products are designed and sold for sanctioned off-road/competition non-emissions controlled vehicles only and may never be used on a public road or highway.

Using Haltech products for street/road use on public roads or highways is prohibited by law unless a specific regulatory exemption exists (more information can be found on the SEMA Action Network website www.semasan.com/emissions for state by state details in the USA).

It is the responsibility of the installer and/or user of this product to ensure compliance with all applicable local and federal laws and regulations. Please check with your local vehicle authority before purchasing, using or installing any Haltech product.

02/2025



Haltech Australia
17 Durian Place,
Wetherill Park NSW 2164
Australia
Phone: +61 2 9729 0999
Email: aus@haltech.com

Haltech New Zealand
9/B Weza Lane, Kumeu NZ 0810
Phone: 09 887 0616
Email: nz@haltech.com

Haltech USA East
750 Miles Point Way,
Lexington, KY USA 40510
Phone: (888) 298 8116
Email: usa@haltech.com

Haltech USA West
Race Winning Brands,
10800 Valley View Street,
Cypress, CA 90630
Phone: (888) 298 8116
Email: usa@haltech.com

Haltech UK
Unit 1, Miras Business Estate,
Keys Park Road, Hednesford,
WS12 2FS
Phone: +44 121 285 6650
Email: uk@haltech.com

Haltech Europe
Ottogasse 2A,
2333 Leopoldsdorf, Austria
Phone: +43 720 883968
Email: europe@haltech.com


facebook.com/HaltechEngineManagement



youtube.com/haltechecu


instagram.com/haltechecu