STANDBY®

When attention matters.

MCS-NXE

DATA SHEET

E11 **10R-0213006**

C-10758-A

Contents

Warnings

When connecting the power supply to the MCS-NXE unit please ensure that the red connectors are seated correctly to avoid causing operational issues. For a short demonstration video click on the image above, scan the QR code, or visit https://www.youtube.com/shorts/nryPMNy-Mcc .

MCS-NX vs MCS-NXE

The MCS-NXE is a stripped-down version of the MCS-NX. To reduce the cost of the device to be more favourable to markets that do not require the siren features, the siren was removed along with a few other circuits, for example the Low power outputs are negative only whereas the MCS-NX can switch positive or negative with its Low power outputs. The MCS-NXE has the same core hardware, utilizes the same MCS-NX-CONFIG software and the same CANlib.

1. Specification

1.1. Absolute Maximum Ratings

	NXE-12-A0	NXE-12-A1	NXE20H-A0	NXE-20M-A0	NXE-20H-A1	NXE-20M-A1
Supply Voltage	32VDC	32VDC	32VDC	32VDC	32VDC	32VDC
Supply Current	50A	50A	90A	70A	90A	70A

	NXE-28-A0	NXE-28-A1				
Supply Voltage	32VDC	32VDC				
Supply Current	110A	110A				

1.2. Electrical Characteristics

	NXE-12-A0	NXE-12-A1	NXE20H-A0	NXE-20M-A0	NXE-20H-A1
Operating Voltage	12-24V	12-24V	12-24V	12-24V	12-24V
Current Consumption					
Running 13.8V	72mA	138mA	74mA	74mA	140mA
Sleeping 13.8V	6mA	14mA	8mA	8mA	16mA
External Shutdown 13.8V	4mA	5mA	6mA	6mA	7mA
Temperature					
Standby	-20°C–70°C	-20°C–70°C	-20°C–70°C	-20°C–70°C	-20°C–70°C
Operating	-20°C–50°C	-20°C–50°C	-20°C–50°C	-20°C–50°C	-20°C–50°C

	NXE-20M-A1	NXE-28-A0	NXE-28-A1
Operating Voltage	12-24V	12-24V	12-24V
Current Consumption			
Running 13.8V	140mA	76mA	142mA
Sleeping 13.8V	16mA	10mA	18mA
External Shutdown 13.8V	7mA	8mA	9mA
Temperature			
Standby	-20°C–70°C	-20°C–70°C	-20°C–70°C
Operating	-20°C–50°C	-20°C–50°C	-20°C–50°C

1.3. Power

	NXE-12-A0	NXE-12-A1	NXE-20H-A0	NXE-20M-A0	NXE-20H-A1	NXE-20M-A1
70Amp DC pluggable connector	1	1	2	1	2	1
Ground / chassis connections	2	2	2	2	2	2

	NXE-28-A0	NXE-28-A1
70Amp DC pluggable connector	2	2
Ground / chassis connections	2	2

1.4. Digital Inputs

	NXE-12-A0	NXE-12-A1	NXE20H-A0	NXE-20M-A0	NXE-20H-A1	NXE-20M-A1
Positive Switched	0	0	4	4	4	4
External Reset	1	1	1	1	1	1
External Standby	1	1	1	1	1	1

	NXE-28-A0	NXE-28-A1
Positive Switched	8	8
External Reset	1	1
External Standby	1	1

1.5. Universal Inputs

	NXE-12-A0	NXE-12-A1	NXE20H-A0	NXE-20M-A0	NXE-20H-A1	NXE-20M-A1
Universal Input	6	6	6	6	6	6

	NXE-28-A0	NXE-28-A1
Universal Input	6	6

1.6. Analog Monitoring

Across All models:

- Supply Voltage sense
- Internal temperature monitor
- High Output channel current monitors
- Medium Output channel current monitors

1.7. Outputs

	NXE-12-A0	NXE-12-A1	NXE20H-A0	NXE-20M-A0	NXE-20H-A1	NXE-20M-A1
High Power 20A	8	8	12	8	12	8
Medium Power 8A	0	0	4	8	4	8
Low Power 2.4A	4	4	4	4	4	4
Siren Output	n\a	n\a	n\a	n\a	n\a	n\a
Supply Output Fused (5A)	1	1	1	1	1	1

	NXE-28-A0	NXE-28-A1
High Power 20A	12	12
Medium Power 8A	12	12
Low Power 2.4A	4	4
Siren Output	n\a	n\a
Supply Output Fused (5A)	1	1

1.8. Communications

Across all models
3 x CAN FD

2. Connectors

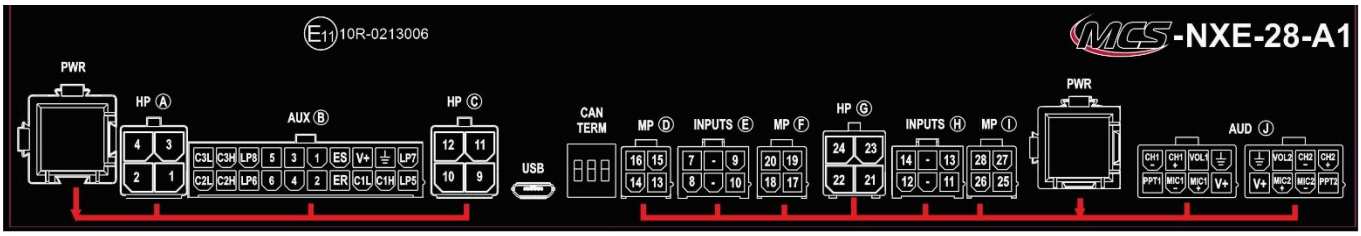

Figure 1 Connectors Layout For all variants

*1.1.1) **PWR - Power Connection***

Pin	Name	Function
1	Supply	12-24V supply for Connectors A-C

*1.1.2) **Connector A - High Power Outputs***

Pin	Name	Function
1	High Power Output 1	User Defined High Power Output (Positive Switched 20A)*Note1
2	High Power Output 2	User Defined High Power Output (Positive Switched 20A)*Note1
3	High Power Output 3	User Defined High Power Output (Positive Switched 20A)
4	High Power Output 4	User Defined High Power Output (Positive Switched 20A)

Note 1 : HP1 and HP2 can be combined to achieve 30A by wiring HP1 and HP2 to the load in parallel. This is enabled in the configuration software.

*1.1.3) **Connector B – Aux Connector***

Pin	Name	Function
1	Low Power Output 5	User Defined Low Power Outputs (Negative 2.4A) *Note2
2	CAN1 H	CAN bus High connection
3	CAN1 L	CAN bus Low connection
4	External Reset	Positive switched Reset input
5	Universal Input 2	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
6	Universal Input 4	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
7	Universal Input 6	User defined input (pull-up or pull-down through 10kΩ or analogue)
8	Low Power Output 6	User Defined Low Power Outputs (Negative 2.4A) *Note2
9	CAN2 H	CAN bus High connection
10	CAN2 L	CAN bus Low connection
11	Low Power Output 7	User Defined Low Power Outputs (Negative 2.4A) *Note2
12	Ground	Chassis
13	Supply Output (Fused)	Supply feed through for external devices (4A Fused)
14	External Standby	Negative switched Standby input
15	Universal Input 1	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
16	Universal Input 3	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
17	Universal Input 5	User defined input (pull-up or pull-down through 10kΩ or analogue)
18	Low Power Output 8	User Defined Low Power Outputs (Negative 2.4A) *Note2
19	CAN3 H	CAN bus High connection
20	CAN3 L	CAN bus Low connection

Note 2 : all low power outputs when placed in drive low mode have a 800µA quiescent current. This may cause false triggering in very light loads. This can be remedied by placing a 1kΩ resistor across the load.

*1.1.4) **Connector C - High Power Outputs***

Pin	Name	Function
1	High Power Output 9	User Defined High Power Output (Positive Switched 20A)
2	High Power Output 10	User Defined High Power Output (Positive Switched 20A)
3	High Power Output 11	User Defined High Power Output (Positive Switched 20A)
4	High Power Output 12	User Defined High Power Output (Positive Switched 20A)

*1.1.5) **Connector D - Medium Power Outputs (High Power in NXE-20H versions)***

Pin	Name	Function
1	Medium Power Output 13	User Defined Medium Power Outputs (Positive Switched 8A) *Note3
2	Medium Power Output 14	User Defined Medium Power Outputs (Positive Switched 8A) *Note3
3	Medium Power Output 15	User Defined Medium Power Outputs (Positive Switched 8A) *Note3
4	Medium Power Output 16	User Defined Medium Power Outputs (Positive Switched 8A) *Note3

Note 3 : Connector D is a High power connector in NXE-20H versions and its outputs would be 20A rated.

1.1.6) ***Connector E - Input Connector***

Pin	Name	Function
1	Positive Input 10	User defined input (pull-down through 11kΩ)
2	No Connection	-
3	Positive Input 8	User defined input (pull-down through 11kΩ)
4	Positive Input 9	User defined input (pull-down through 11kΩ)
5	No Connection	-
6	Positive Input 7	User defined input (pull-down through 11kΩ)

1.1.7) ***Connector F- Medium Power Outputs***

Pin	Name	Function
1	Medium Power Output 17	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 18	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 19	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 20	User Defined Medium Power Outputs (Positive Switched 8A)

1.1.8) ***Connector G - High Power Outputs***

Pin	Name	Function
1	High Power Output 21	User Defined High Power Outputs (Positive Switched 20A)
2	High Power Output 22	User Defined High Power Outputs (Positive Switched 20A)
3	High Power Output 23	User Defined High Power Outputs (Positive Switched 20A)
4	High Power Output 24	User Defined High Power Outputs (Positive Switched 20A)

1.1.9) ***Connector H - Input Connector***

Pin	Name	Function
1	Positive Input 14	User defined input (pull-down through 11kΩ)
2	No Connection	-
3	Positive Input 12	User defined input (pull-down through 11kΩ)
4	Positive Input 13	User defined input (pull-down through 11kΩ)
5	No Connection	-
6	Positive Input 11	User defined input (pull-down through 11kΩ)

1.1.10) ***Connector I- Medium Power Outputs***

Pin	Name	Function
1	Medium Power Output 25	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 26	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 27	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 28	User Defined Medium Power Outputs (Positive Switched 8A)

*1.1.11) **PWR - Power Connection***

Pin	Name	Function
1	Supply	12-24V supply for Connectors D-J

*1.1.12) **Connector J - Audio Connector***

Pin	Name	Function
1	V+	Fused 12-24V output
2	MIC1+	Positive input of microphone1
3	MIC1-	Negative input of microphone1 (not used in single ended applications)
4	PTT1	User defined positively switched input
5	Ground	Audio Ground (Connect to negative side of MIC in single ended)
6	VOL1	Analogue Volume input (Connect through 10kΩ POT to ground)
7	CH1+	Positive output to speaker 4Ω 5W
8	CH1-	Negative output to speaker 4Ω 5W

Pin	Name	Function
1	PTT2	User defined positively switched input
2	MIC2-	Negative input of microphone2 (not used in single ended applications)
3	MIC2+	Positive input of microphone2
4	V+	Fused 12-24V output
5	CH2+	Positive output to speaker 4Ω 5W
6	CH2-	Negative output to speaker 4Ω 5W
7	VOL2	Analogue Volume input (Connect through 10kΩ POT to ground)
8	Ground	Audio Ground (Connect to negative side of MIC in single ended)

*1.1.13) **USB-MICRO***

Used with the MCS-NX-CONFIG for programming the device
http://mheupdate.blob.core.windows.net/mcsnx-config-update/mcsnx-config-install.exe

*1.1.14) **RST - Reset Button***

Button for resetting of the unit.

*1.1.15) **SEL - Select Button***

Button for selecting what information is displayed by the LEDs on the unit. Also used to force the unit into bootloader mode.

*1.1.16) **DIP SELECT - CAN Termination***

Switch	Name	Function
1	CAN3 Termination	Activates a termination resistor on CAN bus 3 (120Ω)
2	CAN2 Termination	Activates a termination resistor on CAN bus 2 (120Ω)
3	CAN1 Termination	Activates a termination resistor on CAN bus 1 (120Ω)

*1.1.17) **SD – SD card slot***

SD Card slot for insertion of an SD.

3. System Description

3.1. Inputs

The External Reset input on pin 4 of connector B is used to force the processor into reset state and is active high. The External Standby input on pin 14 of connector B is used to power down the entire system by forcing the internal regulators to turn off completely, this is an active low signal.

(Connector & Pin)	Analogue Range	Frequency	Pull-Up	Pull-Down
Input 1 (B15)	10V	✓	Configurable	Configurable
Input 2 (B5)	10V	✓	Configurable	Configurable
Input 3 (B16)	10V	✓	Configurable	Configurable
Input 4 (B6)	10V	✓	Configurable	Configurable
Input 5 (B17)	30V		Configurable	Configurable
Input 6 (B7)	30V		Configurable	Configurable
Input 7 (E6)	30V			Fixed
Input 8 (E4)	30V			Fixed
Input 9 (E3)	30V			Fixed
Input 10 (E1)	30V			Fixed
Input 11 (H6)	30V			Fixed
Input 12 (H4)	30V			Fixed
Input 13 (H3)	30V			Fixed
Input 14 (H1)	30V			Fixed

3.2. High Power Outputs

Each of the High-Power outputs is independently capable of switching 20 Amps, but the overall current capability of the system is limited to the total specified for the selected device.

Using the MCS-CONFIG Software, the outputs can be configured for:

- Minimum Voltage Dropout. (Disables the output when the supply voltage drops below the set level)
- Maximum Current Protection (Disabled the output when the output current exceeds the set current level for a period of time)
- Output Function – A selection of flashing patterns is available.
    - Steady On
    - Alternating
    - Multi Flash
    - Penta Pulse
    - Penta Pulse (With Pause)
    - Cyclic
    - Arrow\Direction
    - Double Flash
    - Single HL
    - Mega
    - Quad-SAE
    - Quad-R65
    - Priority Levels – each output function has a user defined priority level to determine function takes precedence, this is determined by the functions position in the list, the higher up the list, the higher the priority.
    - Enable Inputs - Each output function can have multiple inputs. If **ANY** of the enable inputs is active, the output can turn on.
    - Inhibit Inputs – Each output function can have multiple inhibit inputs. If **ANY** of the inhibit inputs is active, the output will not be turned on. Inhibits take precedence over Enables.

3.3. Medium Power Outputs

Each of the Medium Power Outputs is independently capable of switching 8 Amps, but the overall current capability of the system is limited to the total specified for the selected device.

The features and configuration setup are exactly the same as for the High-Power Outputs. See Above for more information.

3.4. Low Power Outputs

There are 4 negative switching outputs. Each output is independently capable of switching 2.4 Amps, but the overall current capability of the system is limited to the total specified for the selected device.

With the exception of current monitoring (there are none for the low power outputs), the features and configuration setup are exactly the same as for the High-Power Outputs. See Above for more information.

See Note 2 above in section 2.1.6 for information of negative switching quiescent current.

3.5. CANBus Serial Interface

The MCS-NXE has three CAN FD full speed interfaces. The first interface is designated for local control using suitable MCS compatible remotes. CAN two is used for communications with the Vehicle and CAN three will be nominally used for telematics and other 3rd party applications.

3.6. Diagnostics And Troubleshoot

Modes of operation denoted by PWR LED

- Steady Red – Running (normal operation)
  - FLT (Fault)
    - Steady Red – Global overcurrent fault present
    - Flashing Purple- Global overtemperature fault present
    - Off – No Faults present
  - DROPOUT
    - Steady Amber – Global Dropout Voltage detected
    - Off – No Dropouts present
  - CAN1, CAN2, CAN3
    - Green – Communications healthy all devices active
    - Cyan -Not all devices are responding
    - Red – No devices responding
    - Off – CAN channel not used
  - OUT (OUTPUTS)
    - Green – Active
    - Off – Inactive
    - Red – Over current fault
    - Amber – Voltage dropout present
  - IN (INPUTS)
    - Green – Active
    - Off – Inactive

- Steady Blue – Updating Slaves
  - FLT (Fault)
    - N\A
  - DROPOUT
    - N\A
  - IN (INPUTS)
    - White – Overall update progress increasing from left to right
  - OUT (OUTPUTS)
    - Blue – Programming progress increasing from left to right
- Steady Cyan – Loading Configuration
  - FLT (Fault)
    - N\A
  - DROPOUT
    - N\A

  - IN (INPUTS)
    - Cyan – Overall Config loading progress increasing from left to right
  - OUT (OUTPUTS)
    - N\A

- Steady Purple – Boot Loader
  - FLT (Fault)
    - Green – Application CRC valid
    - Red – Application CRC invalid
  - DROPOUT
    - N\A
  - IN (INPUTS)
    - Red – Erase progress increasing from left to right
    - Green – Programming progress increasing from left to right
  - OUT (OUTPUTS)
    - N\A
- Steady Orange – Idle
- Steady Green – Going to Sleep
- Flashing Red – Unit is asleep in minimum sleep time
- Double Flash Red – Unit is asleep
- Steady White – Safe mode, system has experienced too many unexpected restarts, reset required.

3.8 USB Connector

The USB connector is a standard USB-Mico connector which allows programming of the device using the MCS-NX-CONFIG application. No external power is required when using the USB cable as this supplies the logic circuitry with the necessary power to program.

3.9 Audio Intercom

The Audio Intercom can be added to the MCS-NXE (denoted by -A1). This is an intercom system that allows for two-way communication via two differential microphone inputs and two 5W speaker outputs. To facilitate this there are two PTT switch inputs and a volume control for each channel. This can also be used to play audio announcements. By default, the intercom will function in the following way.

- PTT1 will enable Mic1 and Ch2 outputs
- PTT2 will enable Mic2 and Ch1 outputs
- Vol1 will control the volume of Ch2 output
- Vol2 will control the volume of Ch1 output

If the user wishes it to behave in a different manner, the intercom is fully configurable in the MCS-NX-CONFIG software.

When playing Audio announcements on the intercom output channels, make sure to set “Enable Advanced Intercom” to True. This is found in the settings pane when clicking on the MCS-NX-64 controller.

4. Revision History

Revision	*Comments*	*By*	*Date*
1V0	Initial Release	KJVR	2025/04/03
1V1	Finalized Currents	KJVR	2025/05/29
1V2	Added NXE vs NX note	KJVR	2025/06/09
1V3	Removed GPS LED details	KJVR	2025/07/21