

STANDBY®

When attention matters.

MCS-NX-16 DATASHEET



10R-0213006

C-10703-A_MDX00056_HW03/25

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1. Specification

1.1. **Absolute Maximum Ratings**

Supply Voltage:	32 Volts DC.
Supply Current:	70 Amps

1.2. **Electrical Characteristics**

Operating Voltage:	12-24 Volts DC
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Current Consumption:

With Siren Module:

Running:	110mA
Sleeping:	22mA
External Shutdown:	6.8mA

Without Siren Module:

Running:	83mA
Sleeping:	17.9mA
External Shutdown:	6.8mA

Temperature

Standby Temperature:	-20 Deg C – 70 Dec C
Operating Temperature:	-20 Deg C – 50 Deg C

1.3. **Power**

- 1 x 70Amp DC pluggable connector.
- 2 x Ground / chassis connections.

1.4. **Digital Inputs**

- 4 x Positive Switched
- 1 x External Reset
- 1 x External Standby

1.5. **Universal Inputs**

- 6 x Universal Inputs

1.6. **Analog Monitoring**

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

1.7. Outputs

- 4 x High Power, current and voltage protected outputs (20A per channel)
- 8 x Medium Power, current and voltage protected outputs (8A per channel)
- 4 x Low Power Positive or Negative current protected Outputs (2.5A per channel)
- 2 x 100W siren speaker outputs
- 1 x 5A internally fused Supply output

1.8. Communications

- 3 x CAN FD

2. Connectors

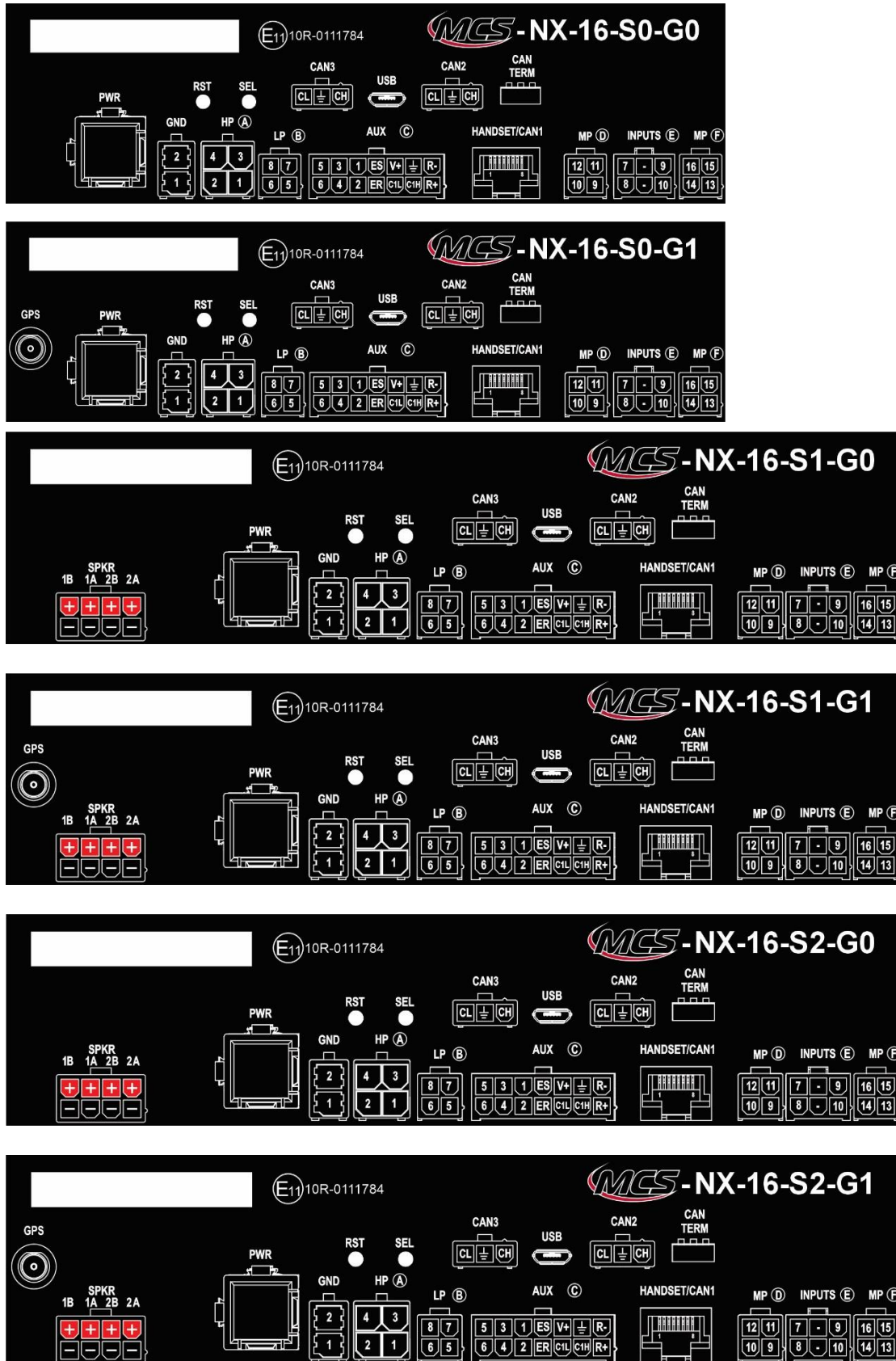


Figure 1 Connector Layouts

1.1.1) GPS (for G1 units only)

Pin	Name	Function
1	GPS	Connection for Active Antenna for GPS function

1.1.2) SPKR -Siren Output (S1 and S2 only)

Pin	Name	Function
1	2A-	Speaker 2 Channel A Negative Output
2	2B-	Speaker 2 Channel B Negative Output
3	1A-	Speaker 1 Channel A Negative Output
4	1B-	Speaker 1 Channel B Negative Output
5	2A+	Speaker 2 Channel A Positive Output
6	2B+	Speaker 2 Channel B Positive Output
7	1A+	Speaker 1 Channel A Positive Output
8	1B+	Speaker 1 Channel B Positive Output

1.1.3) PWR - Power Connection

Pin	Name	Function
1	Supply	12-24V supply

1.1.4) GND - Power Ground

Pin	Name	Function
1	Ground A	Chassis ground
2	Ground B	Chassis ground

1.1.5) Connector A - High Power Outputs

Pin	Function	Function
1	High Power Output 1	User Defined High Power Output (Positive Switched 20A)
2	High Power Output 2	User Defined High Power Output (Positive Switched 20A)
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)

1.1.6) Connector B- Low Power Outputs

Pin	Name	Function
1	Low Power Output 5	User Defined Low Power Outputs (Positive or Negative 2.5A) *Note1
2	Low Power Output 6	User Defined Low Power Outputs (Positive or Negative 2.5A) *Note1
3	Low Power Output 7	User Defined Low Power Outputs (Positive or Negative 2.5A) *Note1
4	Low Power Output 8	User Defined Low Power Outputs (Positive or Negative 2.5A) *Note1

Note 1 : 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.

1.1.7) Connector C - Aux

Pin	Name	Function
1	Radio In +	Positive input for Radio re-broadcast
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	Radio In -	Negative input for Radio re-broadcast
9	Ground	Chassis
10	Supply Output (Fused)	Supply feed through for external devices (4A Fused)
11	External Standby	Negative switched Standby input
12	Universal Input 1	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
13	Universal Input 3	User defined input (pull-up or pull-down through 8.2kΩ or analogue)
14	Universal Input 5	User defined input (pull-up or pull-down through 10kΩ or analogue)

1.1.8) HANDSET/CAN1 - System Connector

Pin	Name	Function
1	CAN1L	CAN bus Low connection (CAN-FD)
2	CAN1H	CAN bus High connection (CAN-FD)
3	MIC-	Negative Microphone input signal
4	Supply	Supply feed through for handsets (1A Fused)
5	Ground	Chassis
6	MIC+	Positive Microphone input signal
7	NC	No connect
8	PTT	Push to Talk

1.1.9) Connector D - Medium Power Outputs

Pin	Name	Function
1	Medium Power Output 9	User Defined Medium Power Outputs (Positive Switched 8A)
2	Medium Power Output 10	User Defined Medium Power Outputs (Positive Switched 8A)
3	Medium Power Output 11	User Defined Medium Power Outputs (Positive Switched 8A)
4	Medium Power Output 12	User Defined Medium Power Outputs (Positive Switched 8A)

1.1.10) 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)

1.1.11) Connector F- Medium Power Outputs

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

1.1.12) CAN3\RS485 Connector

Pin	Name	Function
1	CAN3H\RS485A	CAN3 High (CAN-FD) or RS485A connection
2	No Connection	-
3	CAN3L\RS485B	CAN3 Low (CAN-FD) or RS485B connection

1.1.13) USB-C (Micro Rev1)

Used with the MCS Configurator for programming the device

<http://mheupdate.blob.core.windows.net/mcsnx-config-update/mcsnx-config-install.exe>

1.1.14) CAN2 Connector

Pin	Name	Function
1	CAN2H	CAN2 High (CAN-FD)
2	No Connection	-
3	CAN2L	CAN2 Low (CAN-FD)

1.1.15) RST - Reset Button

Button for resetting of the unit.

1.1.16) 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.

1.1.17) 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)

1.1.18) SD – SD card slot

SD Card slot for insertion of an SD.

3. System Description

3.1. Siren

The siren module supports up to 2x100W (8 Ohm) output speakers.

- NS – no siren module
- S100 – 1x100W or 100W split between both channels
- S200 - 2x100W

With the use of the powerful MCS-NX-CONFIG the siren module can be customized to suit the user's requirements.

The Siren module can be configured to perform the following functions.

- PTT (Handheld Microphone Broadcast)
- Radio Rebroadcast
- HRT (Horn Ring Transfer) to enable and disable siren tones.
 - Single Tap or Double Tap to Start modes.
- 4 (Minimum) industry standard siren tones, playable in any order Wail
 - Yelp
 - Two-Tone
 - Pulsar
- Air Horn
- Low Frequency "BASS" mode

The Siren module also supports the following modes.

- Auto Scroll (Automatically cycles through all selected tones)
- Auto Start (Automatically plays tone when siren is enabled)
- Bass Enable (Run a low frequency tone)
- Bass Time (limit the low frequency to a set time)
- Volume Control (Allowing for low volume output for use in testing without being harmful to the naked ear)

3.2. Inputs

The External Reset input on pin 4 of connector C is used to force the processor in to reset state and is active high. The External Standby input on pin 11 of connector C 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 (C12)	10V	✓	Configurable	Configurable
Input 2 (C5)	10V	✓	Configurable	Configurable
Input 3 (C13)	10V	✓	Configurable	Configurable
Input 4 (C6)	10V	✓	Configurable	Configurable
Input 5 (C14)	30V		Configurable	Configurable
Input 6 (C7)	30V		Configurable	Configurable
Input 7 (E6)	30V			Fixed
Input 8 (E4)	30V			Fixed
Input 9 (E3)	30V			Fixed
Input 10 (E1)	30V			Fixed

3.3. High Power Outputs

There are 4 positive switching High Power outputs.

Each output is independently capable of switching 20 Amps, but the overall current capability of the system is limited to 70A.

Using the MCS-NX-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
- Priority Levels – each output function has a user defined priority level to determine function takes precedence.
- 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.

3.4. 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.

3.5. Low Power Outputs

There are 4 positive or 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.

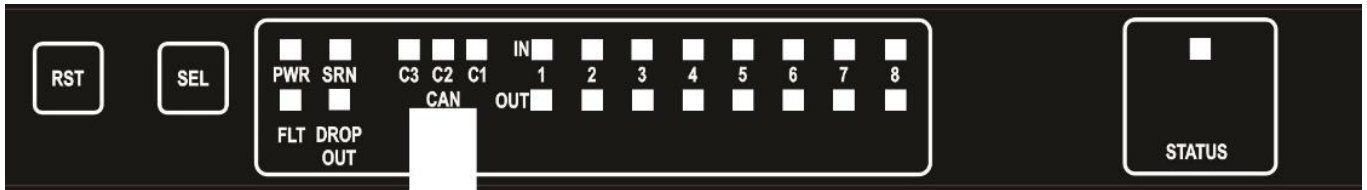
With the exception of current limiting (there are none for the low power outputs), the features and configuration setup are exactly the same as for the High Power Outputs. See Above for more information.

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

3.6. CANBus Serial Interface

The MCS-NX-16 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.

3.7. Diagnostics And Troubleshoot



Modes of operation denoted by PWR LED

- Steady Red – Running (normal operation)
 - SRN (Siren)
 - Steady Green – Siren Running
 - Steady Amber – Siren Voltage Dropout
 - Steady Red – Fault
 - FLT (Fault)
 - Steady Red – Global fault present
 - Off – No Faults present
 - DROPOUT
 - Steady Amber – Dropout detected
 - Off – No Dropouts present
 - C1,C2,C3 (CAN1,CAN2,CAN3)
 - Green – Communications healthy
 - Amber -At least one CAN device not 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
 - Input 7 LED
 - Purple Fast flashing- establishing GPS lock
 - Purple Slow Flash – one second timepulse
 - Input 8 LED
 - Red flashes faster the closer the unit gets to syncing with other MCS-NX units
 - Blue Steady once synced
- Steady Blue – Updating Slaves
 - SRN (Siren)
 - N/A
 - 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
 - SRN (Siren)
 - N/A
 - 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
 - SRN (Siren)
 - N/A
 - 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 micro 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.

4. Revision History

<i>Revision</i>	<i>Comments</i>	<i>By</i>	<i>Date</i>
1V0	Initial Release	KJVR	2021/05/03
1V1	Corrected MCS-NX naming and Updated cover page	KJVR	2021/07/08
1V2	Added LED diagnostics, input descriptions and connectors	KJVR	2021/09/08
1V3	Labeled Connector E Pins correctly	KJVR	2021/09/15
1V4	Updated pull resistor values for Input1-4	KJVR	2022/02/16
1V5	Updated Connector pinouts and LED Diagnostics	KJVR	2022/04/25
1V6	Updated Output description	KJVR	2022/05/10
1V7	Update USB mini to Micro	KJVR	2022/05/11
1V8	Matched Input connector E8 and E9 to software	KJVR	2022/10/17
1V9	Updated Labels and new pin identifiers	KJVR	2024/04/22
1V10	Updated LED Diagnostics	KJVR	2025/01/23