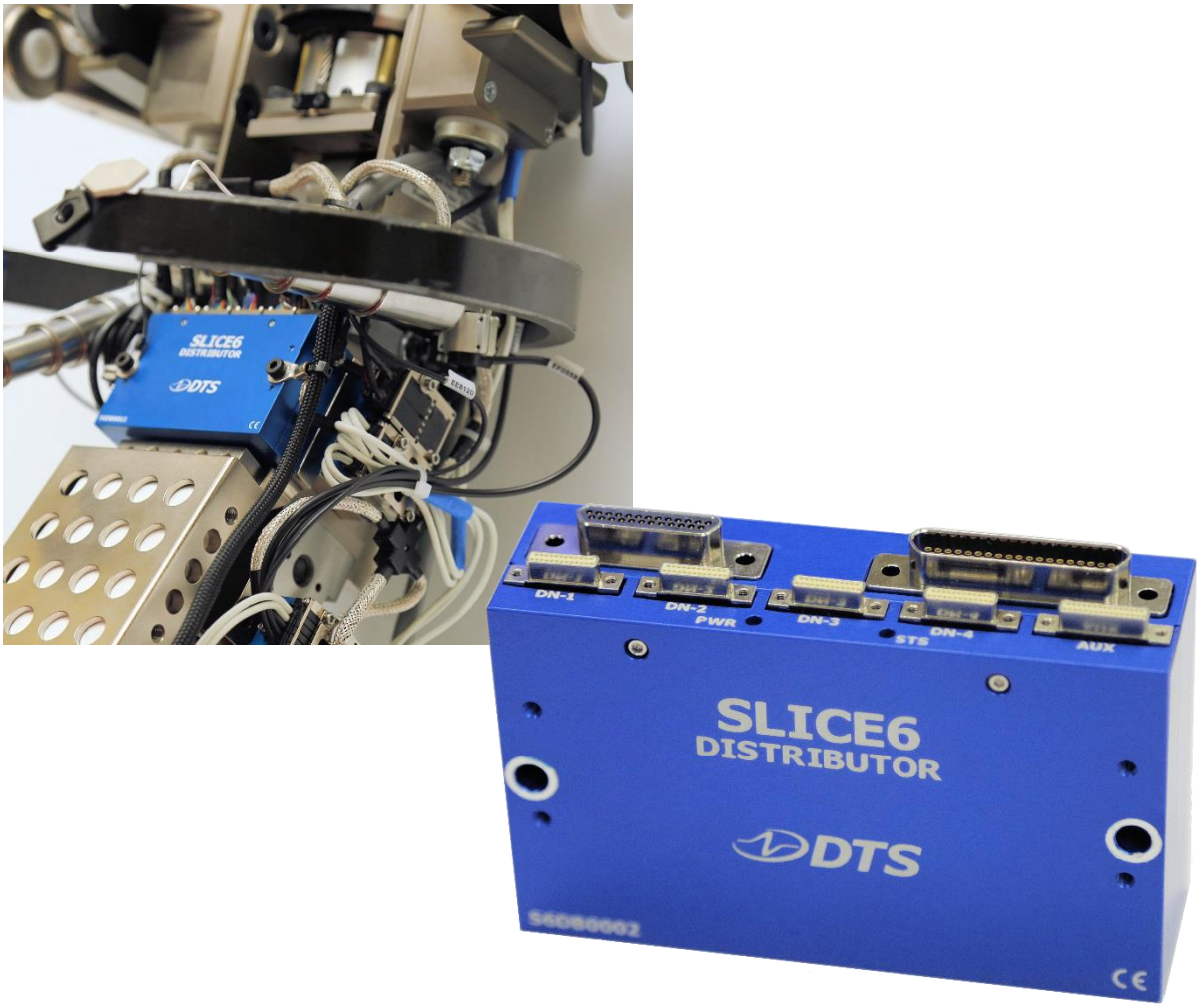
SLICE6 Distributor
(18-36 V input, 15 V output)
User's Manual



November 2019

13006-90320-MAN (Rev. 1)

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DTS Support

SLICE systems are designed to be reliable and simple to operate. Should you need assistance, DTS has support engineers worldwide with extensive product knowledge and crash test experience to help via telephone, e-mail or on-site visits.

The best way to contact a DTS support engineer is to submit a request through the DTS Help Center web portal (support.dtsweb.com). You must be registered (support.dtsweb.com/registration) to submit a request (https://support.dtsweb.com/hc/en-us/requests/new). Registration also enables access to additional self-help resources and non-public support information.

This manual supports the following products:

13006-90320: SLICE6 Distributor (18-36 V input, 15 V output)

Introducing the SLICE6 Distributor

The SLICE6 Distributor is a centralized power and communications management hub suitable for use in dynamic testing environments. Designed for in-dummy use, it supports up to 40 SLICE6 DAS modules (240 channels), primary input power distribution, an external back-up battery, PTPv2 Ethernet communications, and status, control and event signals.

- Shock rated for 500 g for dynamic testing environments.
- Supports 1 Gb Ethernet and PTPv2 communications (IEEE 1588).
- 4 SLICE6 DAS ports support up to 10 SLICE6 DAS per connector.
- Main power and dedicated battery input connector supports primary and back-up power inputs.
- Internal temperature sensor.
- LED indicators for power and system status.
- Dedicated connector supports external ID/status tag and 4 temperature sensors.

Appendix A contains connector information and pin assignments. Appendix B details the unit's mechanical specifications. Appendix C provides information on the network parameters of your equipment.

Connector Panel

All connectors and LED indicators are accessible from the front panel. The BATTERY connector supports an external back-up battery. The UP connector supports primary input power, external communications, status, control and event signals. Connectors DN-1 through DN-4 support SLICE6 DAS. The AUX connector supports an external ID/status tag and 4 temperature sensors. A discussion of the LEDs begins on page 7.

SLICE6 Distributor Connector Panel

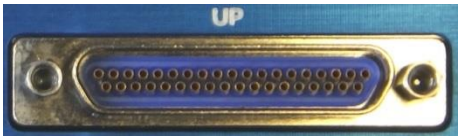
The SLICE6 Distributor does not contain an internal battery and must be connected to external power (main or battery) at all times for operation.

BATTERY Connector

The BATTERY connector supports use and charging of lithium-ion batteries as a back-up power source. Only DTS-supplied batteries should be used. The battery can be hardware enabled and a temperature sensor (included in DTS batteries) is also supported.

The external battery will charge whenever sufficient external power is connected to the UP connector, however the fastest charge rate is when the SLICE6 Distributor is in a power down state (i.e., the ON signal is absent). When the ON signal is present, the SLICE6 Distributor is fully functional, however external power is principally used to support the SLICE6 Distributor and the attached DAS, thus reducing battery charging to a minimum. For information on power requirements, see page 9.

UP Connector



The UP connector supports primary input power and Ethernet communications. System status, ON and event signals are also supported via simple contact closure. Data from the internal temperature sensor may be monitored and recorded from within the software.

NOTE:

An event or trigger signal forwarded from the SLICE6 DAS chain to the SLICE6 Distributor is NOT exported outside the SLICE6 Distributor. This also applies to level trigger.

Level trigger is NOT recommended when SLICE6 DAS is used in in-dummy testing.

See Appendix A for pin assignments. See Appendix C for the network parameters of your equipment. For information on power requirements, see page 9.

Communication Method

Ethernet communications between the SLICE6 Distributor and the host PC are supported at 1 Gb. With sufficient power applied and an ON signal present, the SLICE6 Distributor will power up within 15-30 s (static IP or DHCP, respectively), after which communication is enabled.

The SLICE6 Distributor supports Ethernet PTPv2 communications (IEEE 1588 compliant). PTP (Precision Timing Protocol) provides standards for precision clock synchronization for measurement and control systems via Ethernet network communications. Timing information is extracted from the network's master clock and used by the SLICE6 Distributor to adjust its internal (local) clock, providing precision timing for high channel-count systems with a sampling synchronization better than 10 µs.

SLICE6 DAS Connectors (DN-1 through DN-4)

These 4 connectors are identical and support output power, Ethernet, status, start, ON and event signals. Each connector supports up to 10 SLICE6 DAS for a total of 40 DAS or 240 channels. Ethernet communications between the SLICE6 Distributor and SLICE6 DAS are supported at 100 Mb.

NOTE:

An event or trigger signal applied anywhere in the SLICE6 DAS chain is distributed throughout the DAS chain and forwarded to the SLICE6 Distributor, but is NOT exported outside the SLICE6 Distributor. This also applies to level trigger.

Level trigger is NOT recommended when SLICE6 DAS is used in in-dummy testing.

For detailed information on SLICE6 DAS operation, please see the SLICE6 DAS User's Manual.

AUX Connector

The AUX connector supports several optional functions including LED signal mirroring and 4 external temperature sensors. LED signal support mirrors the PWR and STS LED states, allowing system status visibility using an external pendant or other indicator when the SLICE6 Distributor front panel is not visible. Data from external temperature sensors may be monitored and recorded from within the software.

LEDs

There are 2 LED indicators. The STS LED indicates communication and arm status and the PWR LED indicates power status. At system power-up, the red-green-blue LED initialization sequence is performed by the STS LED followed by the PWR LED.

LED behavior is summarized below.

	PWR		
External Battery Capacity[1]	Charging when Off	Charging when On	Discharging when On
>90%	●	●	●
>50% - <90%	☀ (0.5 Hz)	☀ (0.5 Hz)	☀ (0.5 Hz)
>20% - <50%	☀ (2 Hz)	☀ (2 Hz)	☀ (2 Hz)
<20% –or– fault	●	●	●

[1] The SLICE6 Distributor does not contain an internal battery and must be connected to external power (main input or battery) at all times.

Recorder Mode	STS	**Circular Buffer Mode**
Armed and waiting for Start Record signal to begin data collection	●	
Start Record signal received and recording data; waiting for Event signal (optional)	●	Armed and recording data; waiting for Event signal
Event signal received (optional) –or– fault signal received + data collection completed (no comm) –or– fault	●	Event signal received –or– fault signal received + data collection completed (no comm) –or– fault
Data collection completed, PC downloading data; communicating with host	☀	Data collection completed, PC downloading data; communicating with host

Basic Care and Handling

SLICE6 systems are precision devices designed to operate reliably in dynamic testing environments. Though resistant to many environmental conditions, care should be taken not to subject the units to harsh chemicals, submerge it in water, or drop it onto any hard surface.

WARNING:

Electronic equipment dropped from desk height onto a solid floor may experience up to 10,000 g. Under these conditions, damage to the exterior and/or interior of the unit is likely.

Your unit is supplied with calibration data from the factory. DTS recommends annual recalibration to ensure that the unit is performing within factory specifications. The SLICE6 Distributor is not user-serviceable and should be returned to the factory for service or repair.

When not in use or if shipping is required, we suggest that you place the unit in the padded container originally provided with your unit.

Shock Rating

The SLICE6 Distributor is rated for 500 g, 3 ms half-sine duration, in all axes.

Mounting Considerations

SLICE6 equipment should be bolted securely to the test vehicle or dynamic testing device to provide the best shock protection. Mounting methods and hardware selection should be carefully calculated to withstand expected shock loading and facilitate proper grounding. Check bolt tightness periodically to ensure that the unit is securely fastened to the baseplate or testing platform.

DTS strongly recommends that all equipment be properly grounded to minimize any risk of data noise due to high-current transients. The test vehicle or dynamic testing device should be connected to earth ground. SLICE6 equipment should be grounded to each other and bolted to the test article. DTS recommends checking continuity between the enclosures of each unit to confirm resistance readings of <1 ohm.

Thermal Considerations

It is unlikely that thermal overload will be an issue in real-world testing if proper mounting methods are observed and common-sense measures are taken. Never mount the unit to a thermally non-conductive surface like wood or plastic. ALWAYS use the SLICE6 Distributor with a heat sink or mount it to a structure that will serve this purpose. When used continuously at the max output level, the unit may get very warm. Since the system draws the most power when armed, running the calibrations and arming as late as possible will minimize self-heating, particularly in embedded/in-dummy applications. Avoid full power for longer than 30 min and consider monitoring temperatures during extended arming periods. If you have any questions about using the SLICE6 Distributor in your environment, please contact DTS.

Power Management

The SLICE6 Distributor does not contain an internal battery and must be connected to external power at all times for operation. The SLICE6 Distributor should be powered from a high-quality power source with output voltage and current ratings appropriate for the installation. A flashing PWR LED (any color) or a solid green, blue or yellow LED means voltage and current input levels are within specifications and polarity is correct. (A discussion of the PWR LED begins on page 7.) Be sure to consider any power drop due to cable length.

Input power (UP connector): 18-36 VDC range; 12 A maximum[1]

Output power to DAS (via UP connector): 15 VDC, 2.1 A maximum per DAS connector

The external battery[2] will charge whenever sufficient external power is connected to the SLICE6 Distributor, however the fastest charge rate (4 A) is when the ON signal is absent. When the ON signal is present, the SLICE6 Distributor is fully functional, however external power is principally used to support the SLICE6 Distributor and the attached DAS, thus reducing battery charging to a minimum (50 mW).

Output power to DAS (via BATTERY): 9-12.75 VDC, 2.3 A maximum per DAS connector

An ATD using a SLICE6 Distributor supporting 154 SLICE6 DAS channels and an external battery will require a 110 W power supply when the system is on, fully armed and charging the external battery.

Power-up and Power-down Procedures

With sufficient power applied, the SLICE6 Distributor will power up (enable control system electronics, communications, output power and battery charging) when an ON signal is present. If an ON signal is absent, only battery charging is enabled. Power up (on state) occurs within 15-30 s (static IP or DHCP, respectively), after which communication is enabled.

Power down is immediate upon removal of external power. Wait ~30 s before reinitializing the system.

[1] 216 W maximum.

[2] Use DTS-supplied, lithium-ion batteries only.

Software

Currently, only DataPRO software supports the SLICE6 Distributor. Additionally, the operation of your system depends greatly on the features and functionality of the DAS and support equipment available to you. Please see the DataPRO software manual and your equipment user's manuals for detailed discussions and implementation specifics.

Minimum PC Specifications

Parameter	DataPRO
Operating system	Windows Vista, 7, 8 or 10. 32- and 64-bit
Processor	Multicore
RAM	4 GB; 8 GB recommended*
Hard drive disk space	250 MB + more for test data
Screen resolution	1920 x 1080; 1366 x 768

* More RAM is important for high channel counts and longer/higher sample rates.

Appendix A: Connector Information

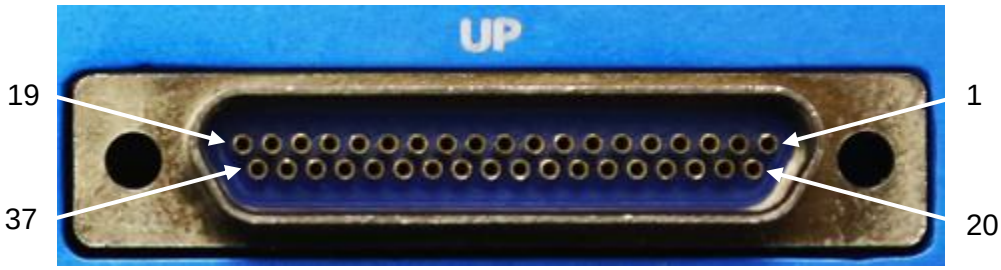
External BATTERY Connector*
(Omnetics A98081-025)

(looking into the connector)

Pin	Function
1	-VDC input from external battery
2	-VDC input from external battery
3	-VDC input from external battery
4	-VDC input from external battery
5	-VDC input from external battery
6	+VDC input from external battery
7	+VDC input from external battery
8	+VDC input from external battery
9	+VDC input from external battery
10	+VDC input from external battery
11	Battery 1 temp sensor (reference to Ground)
12	Battery 2 temp sensor (reference to Ground)
13	Ground
14	-VDC input from external battery
15	-VDC input from external battery
16	-VDC input from external battery
17	-VDC input from external battery
18	-VDC input from external battery
19	+VDC input from external battery
20	+VDC input from external battery
21	+VDC input from external battery
22	+VDC input from external battery
23	+VDC input from external battery
24	Battery 1 enable (reference to Ground)
25	Battery 2 enable (reference to Ground)

* For use with DTS-supplied batteries only.

UP Connector
(Omnetics A99116-037)



(looking into the connector)

Suggested mating connector P/N:
A98101-037 (includes jack screws and 18" pigtails)

Pin	Function
1	Ground
2*	Ethernet TxRxA (+)
3*	Ethernet TxRxB (+)
4*	Ethernet TxRxC (+)
5*	Ethernet TxRxD (+)
6	/ON (contact closure input to Ground)
7	Common for start record
8	Event - (contact closure to pin 26)
9	Ground
10	Ground
11	Ground
12	Ground
13	Ground
14	Ground
15	Reserved
16	VDC input
17	VDC input
18	VDC input
19	VDC input

Pin	Function
20	Ground
21*	Ethernet TxRxA (-)
22*	Ethernet TxRxB (-)
23*	Ethernet TxRxC (-)
24*	Ethernet TxRxD (-)
25	Start recording input (apply 5 V with respect to pin 7)
26	Event + (contact closure to pin 8)
27	Status (reference to Ground)
28	Ground
29	Ground
30	Ground
31	Ground
32	Ground
33	Ground
34	VDC input
35	VDC input
36	VDC input
37	VDC input

* All signals required for Ethernet comm.

WARNING:

Do not apply external voltages to the event, communication, status or ON signals—this could result in damage to the unit.

SLICE6 DAS Connectors (DN-1 through DN-4)
(Omnetics A38100-825)

(looking into the connector)

Suggested mating connector P/N:
A29000-125 (includes jack screws and 18" pigtails)

Pin	Function
1	/ON-DAS (contact closure input to Ground)
2	No connection
3	STATUS-DAS
4	/START-DAS (contact closure input to Ground)
5	No connection
6	/EVENT-DAS (contact closure input to Ground)
7	Ground
8	STATUS-HUB
9	Ground
10	Ground
11	VDC output
12	VDC output
13	Ground
14	Ethernet Tx (+)
15	Ethernet Tx (-)
16	Ethernet Rx (+)
17	Ethernet Rx (-)
18	No connection
19	No connection
20	No connection
21	No connection
22	Ground
23	Ground
24	VDC output
25	VDC output

AUX Connector
(Omnetics A38100-831)

(looking into the connector)

Suggested mating connector P/N:
A29000-131 (includes jack screws and 18" pigtails)

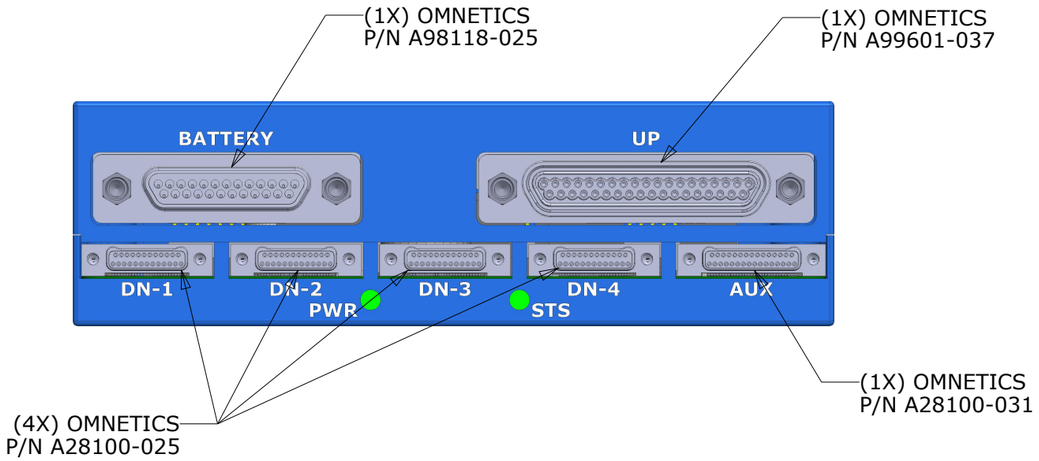
Pin	Function
1	Ground
2	Temp sensor clock (1)
3	Temp sensor clock (2)
4	Temp sensor clock (3)
5	Ground
6	Temp sensor data (1)
7	Temp sensor data (2)
8	Temp sensor data (3)
9	PPS out (IEEE 1588 test output)*
10	Ground
11	STS LED, blue (cathode)
12	Ground
13	STS LED, red (cathode)
14	PPS in (IEEE 1588 test input)*
15	STS LED, green (cathode)
16	Ground

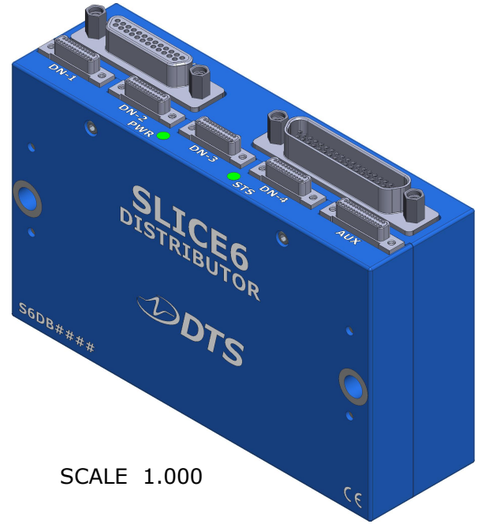
Pin	Function
17	Temp sensor 1 VDC
18	Temp sensor 1 enable
19	Temp sensor clock (4)
20	Temp sensor 2 VDC
21	Temp sensor 2 enable
22	Temp sensor data (4)
23	Temp sensor 3 VDC
24	Temp sensor 3 enable
25	Temp sensor 4 VDC
26	Temp sensor 4 enable
27	LED VDC (anode for STS LED)
28	LED VDC (anode for PWR LED)
29	PWR LED, red (cathode)
30	PWR LED, green (cathode)
31	PWR LED, blue (cathode)

* Separate IEEE 1588 testing can be performed using additional hardware (external PTP grandmaster clock, WIAMan rack, scope or logic analyzer, etc.) and properly configured test network and equipment. Contact DTS for assistance.

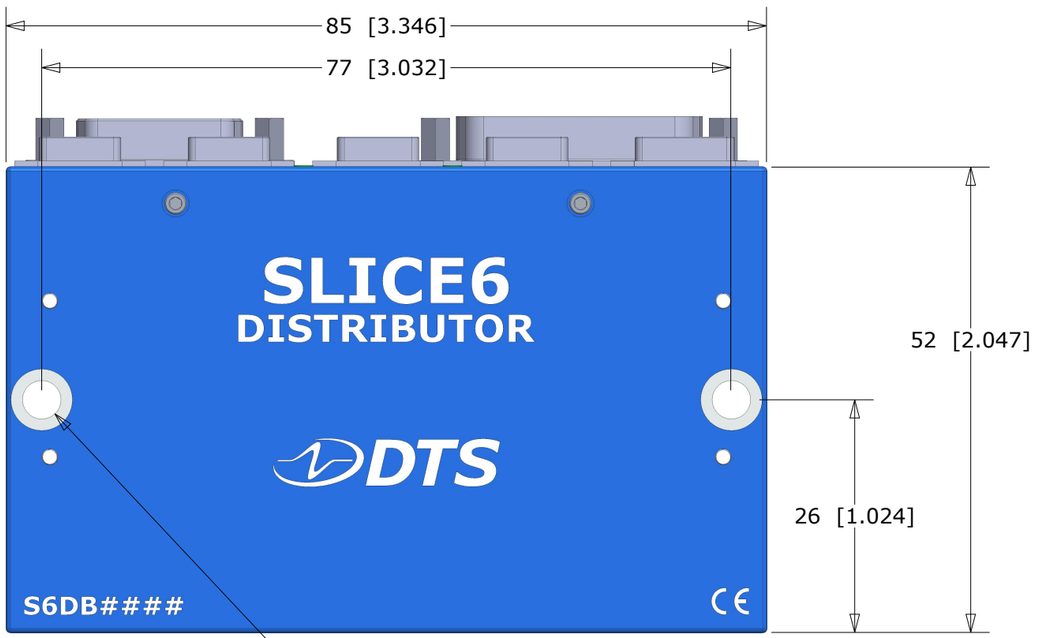
RoHS
Manufacture/fabricate to meet the EU RoHS Directive 2011/65/EU and RoHS Annex II phthalates

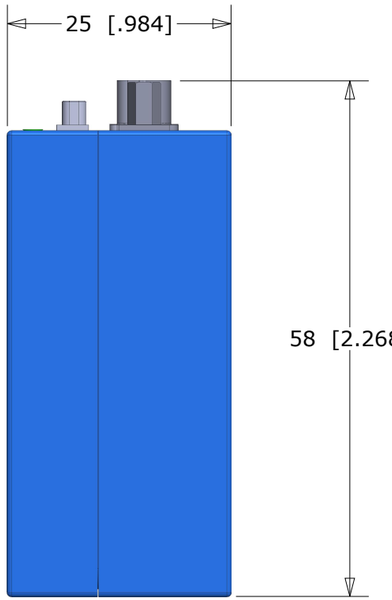
REV	ZONE	DESCRIPTION	DATE	BY
0		ORIGINAL RELEASE	2017-07-18	JC





SCALE 1.000





WEIGHT: 185 GRAMS

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCES ARE:

DECIMAL	INCHES	ANGLES	UNITS:INCH
.X	±.02	±.25°	
.XX	±.01	63	
.XXX	±.005		

DO NOT SCALE. INTERPRET PER ASME Y14.5

REMOVE BURRS & BREAK SHARP EDGES
DIMENSION LIMITS APPLY AFTER PLATING

DTS SEAL BEACH, CA 90740
562-493-0158
www.dtsweb.com

MATERIAL: 6061-T6 ALUMINUM

FINISH:

DESCRIPTION: SLICE6 DISTRIBUTOR, MOUNTING DRAWING

DTS P/N:

REV: 0

DRAWN: J CASEY

DATE: 2017-07-18 | SIZE: B | SCALE: 1.5:1 | SHEET: 1 OF 1

MDL: SLICE6-DB

Accessories/Support Equipment

13006-90341: SLICE6 ATD Back-up Battery (10.8 V)
13006-90350: SLICE6 ATD ID and Status LED Pendant
13006-90360: Cable, SLICE6 Distributor (UP) to Mini Distributor (SYSTEM) (150 cm)
13006-90380: Cable, SLICE6 Distributor AUX to ID Pendant + 2 Temp Sensors
13006-90410: SLICE6 Distributor Interface Device

Appendix C: Hardware Configuration Specifications

SLICE6 Distributors are typically delivered with default network specifications as follows:

IP address	192.168.0.1xx where: xx = 01-99 for S/Ns S6DB0001-S6DB0099
Netmask	255.255.252.0
MAC address	00:19:9B:00:36:xx where: xx = 01-99 for S/Ns S6DB0001-S6DB0099

The *SLICE Network Configuration Utility* (discussed below) can be used to determine the current network specifications of your unit. If the utility is not available, the packing slip for your equipment identifies the network specifications as shipped from the factory. If the packing slip is not available, try using the default specifications described in the table above.

If you need information on the specifics of your equipment, please submit a request through the DTS Help Center web portal (support.dtsweb.com) and include the serial number(s) of the equipment and parameters you are asking about.

Using the *SLICE Network Configuration Utility*

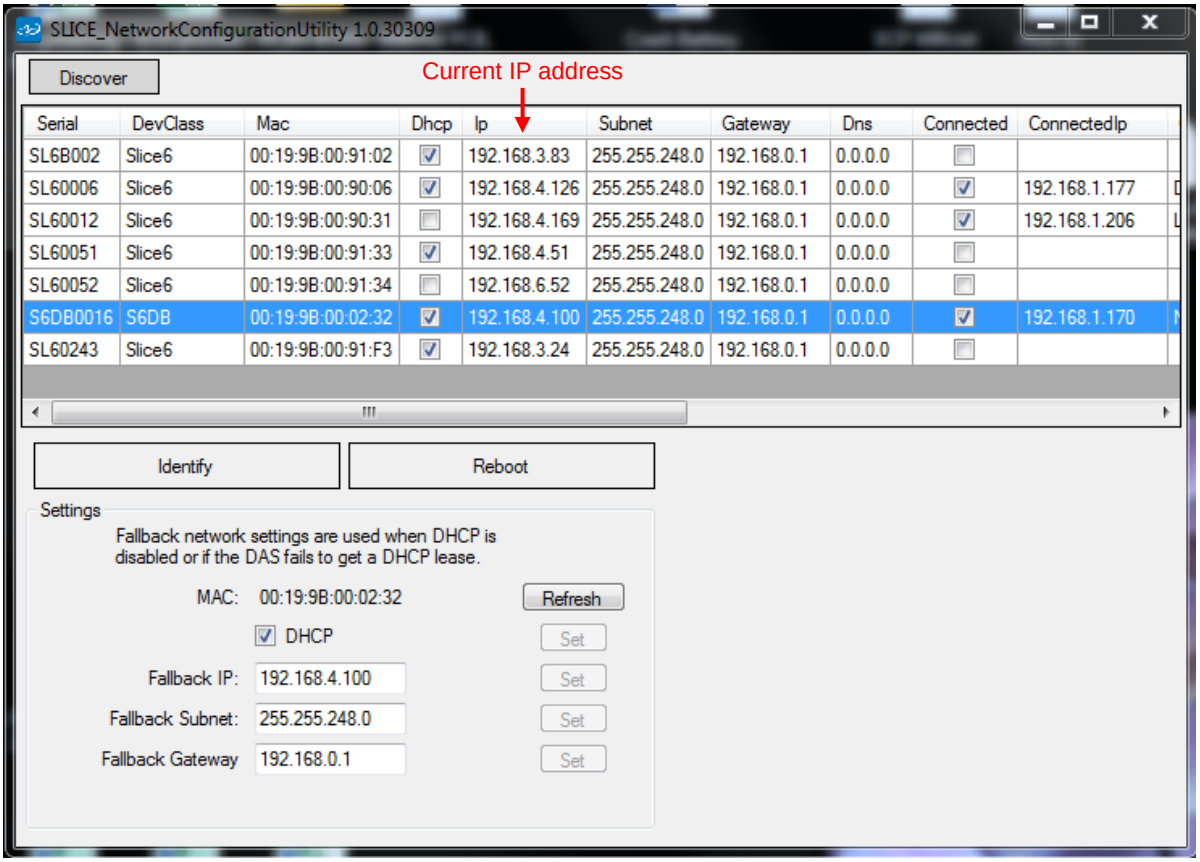
The *SLICE Network Configuration Utility* (available from the DTS Help Center) can be used to view or change the unit's IP address.

Use of the utility requires a network that supports multicast and the workstation running the utility must also allow it. Confirm that:

- The PC's Ethernet properties are not using anything that can block multicast; e.g., *DNE LightWeight Filter*.
- The Windows Firewall will allow multicast traffic.
- Any third-party anti-virus software will allow multicast traffic.

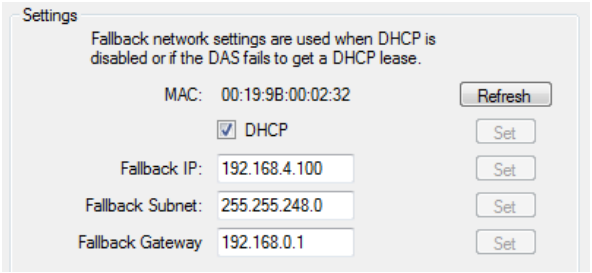
1. Open the *SLICE Network Configuration Utility*.

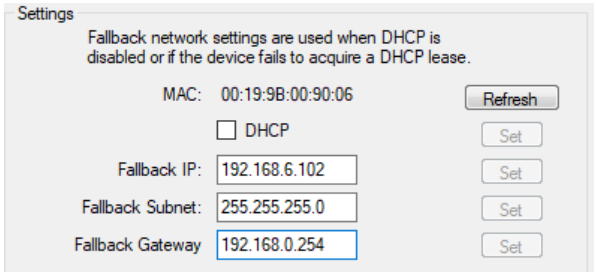
2. The software will immediately look for all attached devices and list them in the table. (You may also click Discover to refresh the list.)



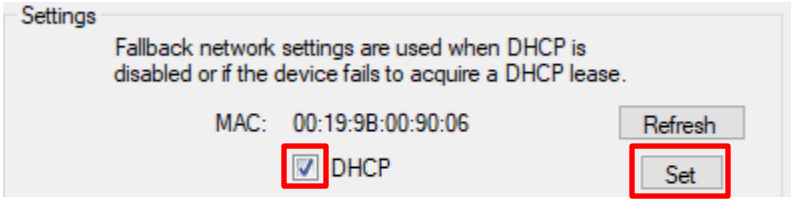
Note: Clicking on Identify for any selected device will cause the unit's LED to flash.

3. Select the SLICE6 device from the list. (A SLICE6 Distributor is selected in the image above.) The device Settings are shown at the bottom of the window. The current IP address may or may not match the fallback IP address, depending on whether DHCP is selected.



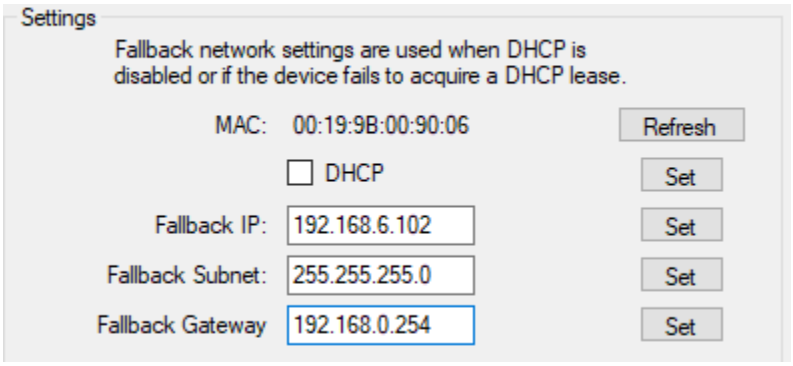


4. To enable DHCP, select the check box then select Set . Proceed to step 7.

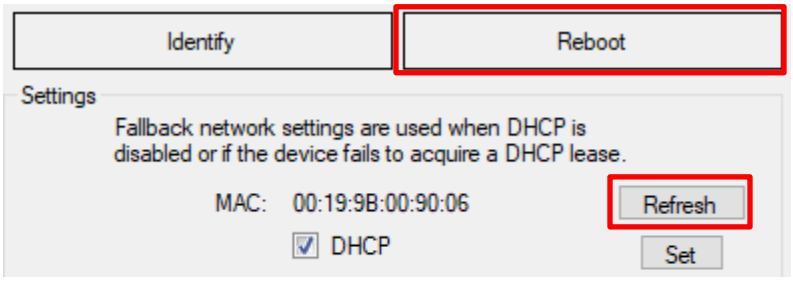


5. To disable DHCP and manually enter IP address and other information, unselect the check box.

6. Enter the new parameters and select Set for each item updated. (Note: The MAC address is not user configurable.)



7. Select Refresh to view the settings (optional), then Reboot the device.



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DECLARATION OF CE CONFORMITY

Description	Model
Data Acquisition Module	SLICE6 DAS Module
Distribution Unit	SLICE6 Distributor

The undersigned hereby declares that the products listed above, manufactured by Diversified Technical Systems, Inc., Seal Beach, California, USA, conform to the following directive and standards:

Applicable Council Directive: **89/336/EEC – Electromagnetic Compatibility**

Applicable Harmonized Standards: **EN 55022:1998, EN 55024:1998**

Stephen Pruitt, President
Diversified Technical Systems, Inc.

May 22, 2018
Date

Revision History

Rev	Date	By	Description
1	11 Nov 2019	EK	Revised Power Management section. Corrected in-dummy battery accessory P/N. Added IEEE 1588 test pins to AUX connector.
0	12 Sep 2018	EK	Initial release.