

**APPLICATION NOTE NUMBER 21**  
**SAE J1939 COMMUNICATIONS (CANBUS)**

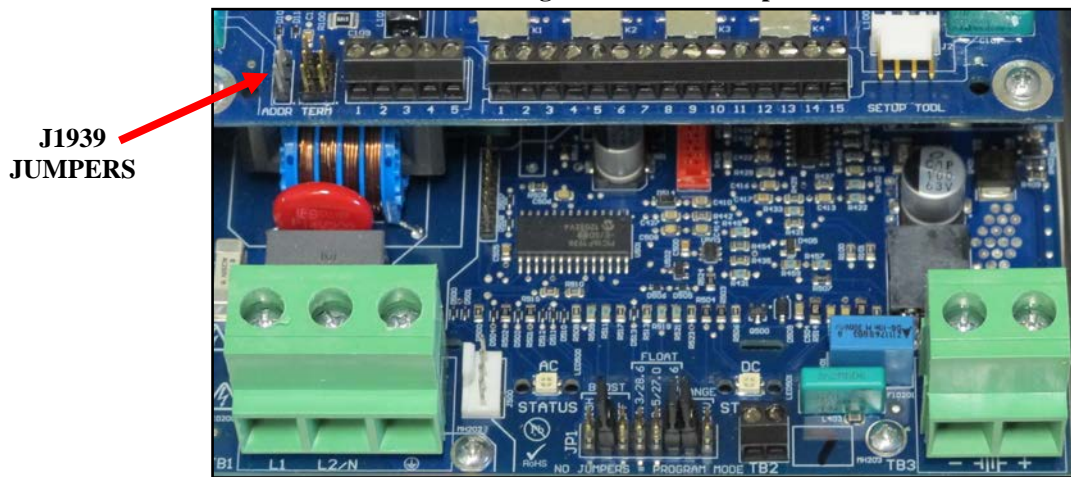
**Introduction**

The optional J1939 interface on the MicroGenius 150 is intended to provide genset suppliers with a highly reliable, low cost method to present all the information required by NFPA 110 to the genset controller, eliminating the need for a volt/amp display and alarm relays in the battery charger. To be operational, the genset controller must support the charger’s J1939 connection.

**J1939 Charger Setup**

Configure the charger for J1939 operation by placing jumpers on the ADDR and TERM jumper strips as described below.

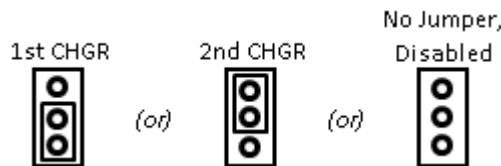
**Figure 1 – J1939 Setup**



**ADDR Jumper**

J1939 supports two battery chargers per network cable. Set the ADDR jumper on JP2 to position 1 for main charger or position 2 for auxiliary charger (see Figure 2). The jumper is set to position 1 by default. Remove the ADDR jumper to disable J1939 communications or enable PROGRAM MODE which engages settings programmed using the MicroGenius Setup Utility.

**Figure 2 – J1939 ADDR Jumper Position**



**TERM Jumpers**

Enable the TERM jumpers on JP3 if the battery charger is at the end of the J1939 cable and only if a separate terminator is not already in place (see Figure 3). Cable terminations are applied only at the ends of the bus. J1939 networks typically provide a separate termination attached to the cabling. To verify the termination status, measure DC resistance between CANL and CANH with the data cable connected *and all devices on the J1939 CANbus powered off*. Interpret the resistance reading per Table 1. The jumpers are set in the disable position by default.

**Figure 3 – J1939 TERM Jumper Positions**



**Table 1 – J1939 Resistance Verification**

Resistance ( $\Omega$ )			Interpretation
Min.	Nom.	Max.	
N/A	N/A	45	More than two bus terminators; shorted or overloaded bus
46	60	80	Two bus terminations (normal reading)
81	120	140	One bus termination (connect or enable missing terminator)
141	N/A	N/A	No bus terminations; open or disconnected data cable

**J1939 Connections**

Connect J1939 wiring to terminal block TB4 in the charger (see Figure 1 and Figure 4). SAE J1939-11 recommends shielded twisted-pair for the CANbus cable. The terminals accept 28-16 AWG (0.08-1.5 mm<sup>2</sup>) conductors. Tighten connections to 2.0 Lb-In (0.22 Nm). Route wiring at least ¼ inch (6 mm) away from DC wiring, AC wiring, and the circuit board. Typical installations only connect the CAN High and CAN Low wires.

**Figure 4 – J1939 Connections**



- TB4-1: Ground\***
- TB4-2: CAN Data Low**
- TB4-3: Shield\*\***
- TB4-4: CAN Data High**
- TB4-5: Power\***

\*MicroGenius does not require this circuit. Terminals provided for power supply wires present in some installations.  
 \*\*Shield terminal has a DC blocking capacitor. Connecting the shield will not produce a DC "ground loop" path.

**Using J1939 Communications**

See Table 2 for read-only information available using J1939. Charger operation parameters may not be configured using J1939 communications.

**Table 2 – J1939 Read-only Information**

J1939 Data	Details
Output Current	-1600.00 to +1612.75A in 0.05A increments, 0xFFFF = data not available
Output Voltage	0 to 3212.75V in 0.05V increments, 0xFFFF = data not available
Battery Charger State	0 = OFF, 1 = boost charge, 2 = float charge, 13 = battery failure/too hot/cold to charge, 14 = charger failure, 15 = N/A
AC Power Line State	0 = AC OFF, 1 = AC ON, 2 = sensing error, does not indicate power out of specification, 3 = N/A
Low Cranking Voltage Alarm*	0 = OK, 1 = Fail, 2 = sensor failure, 3 = N/A
Low DC Voltage Alarm*	0 = OK, 1 = Fail, 2 = sensor failure, 3 = N/A
High DC Voltage Alarm*	0 = OK, 1 = Fail, 2 = sensor failure, 3 = N/A
Battery Temperature Alarm*	0 = OK, 1 = Fail, 2 = sensor failure (open/shorted), 3 = N/A
Thermal Limit Alarm*	0 = OK, 1 = Fail, 2 = sensor failure, 3 = N/A
Invalid Settings Alarm*	0 = OK, 1 = Fail, 2 = sensor failure, 3 = N/A
Output Voltage Jumper Settings*	8 bits corresponding to JP1 output jumpers on circuit board: 0 = no jumper, 1 = jumper present

\*Optional, must enable SENS data extensions using MicroGenius Configuration Utility