

GENIUS BUS CABLE SELECTION

Genius Communications Modules are connected by a bus of shielded, twisted pair cable. A wide selection of cable types are suitable, to meet a broad range of application needs.

Cable # & Make	Outer Diameter	Terminating Resistor -10/+20% 1/2 Watt	Number of Conductors / AWG	Di-Electric Voltage Rating	Ambient Temp. Rating	Maximum Length Cable Run, feet/meters at baud rate			
						153.6s	153.6e	76.8	38.4
(A) 9823 (B) 9182 (C) 4596	0.350in 8.89mm	150 ohms	2 / #22	30v	60°C	2000ft 606m	3500ft 1061m	4500ft 1364m	7500ft 2283m
(B) 89128	0.322in 8.18mm	150 ohms	2 / #22	150v	200°C	2000ft 606m	3500ft 1061m	4500ft 1364m	7500ft 2283m
(B) 9841	0.270in 6.86mm	120 ohms	2 / #24	30v	80°C	1000ft 303m	1500ft 455m	2500ft 758m	3500ft 1061m
(A) 9818C (B) 9207	0.330in 8.38mm	100 ohms	2 / #20	300v	80°C	1500ft 455m	2500ft 455m	3500ft 1061m	6000ft 1818m
(A) 9109 (B) 89207 (C) 4798	0.282in 7.16mm	100 ohms	2 / #20	150v	200°C	1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A) 9818D (B) 9815	0.330in 8.38mm	100 ohms	2 / #20			1500ft 455m	2500ft 758m	3500ft 1061m	6000ft 1818m
(A) 9818 (B) 9855	0.315in 8.00mm	100 ohms	4 (two pair) #22	150v	60°C	1200ft 364m	1700ft 516m	3000ft 909m	4500ft 1364m
(A) 9110 (B) 89696 (C) 89855	0.274in 6.96mm	100 ohms	4 (two pair) #22	150v	200°C	1200ft 364m	1700ft 516m	3000ft 909m	4500ft 1364m
(A) 9814C (B) 9463	0.243in 6.17mm	75 ohms	2 / #20	150v	60°C	800ft 242m	1500ft 455m	2500ft 758m	3500ft 1061m
(A) 5902C (B) 9302	0.244in 6.20mm	75 ohms	4 (two pair) #22	300v	80°C	200ft 30m	500ft 152m	1200ft 333m	2500ft 758m

Notes: (A) = Alpha. (B) = Belden. (C) = Consolidated. Genius Bus is limited to 16 taps at 38.4 Kbaud

Proper cable selection is critical to successful operation of the system. The cables listed above have been tested and are recommended for use. Correct operation of other cable types is not assured, and their use is not recommended. Each bus in the system can be any cable type listed in the table. The 89182, 89207, 4794, 89696, and 89855 types are high temperature cables for use in severe environments, and are qualified for use in air plenums. The 9815 type is water resistant, and can be used where direct burial is required. Similar cables of equivalent terminating resistance such as 9207, 89207, and 9815 can be mixed. Do **NOT** mix cables of different impedance, regardless of cable run length. The maximum run for mixed cable type equals the shortest length recommended for any of the types used.

It is recommended that the cable is run in separate grounded metal conduit, to improve noise reduction. The cable **MUST** be kept away from high current/high voltage wiring (such as motor/door operator wiring, or voltages over 120VAC). Conservative wiring practices, as well as national and local codes, require physical separation between control circuits and power distribution or motor power. Refer to sections 430 and 725 of the National Electric Code.

BAUD RATE

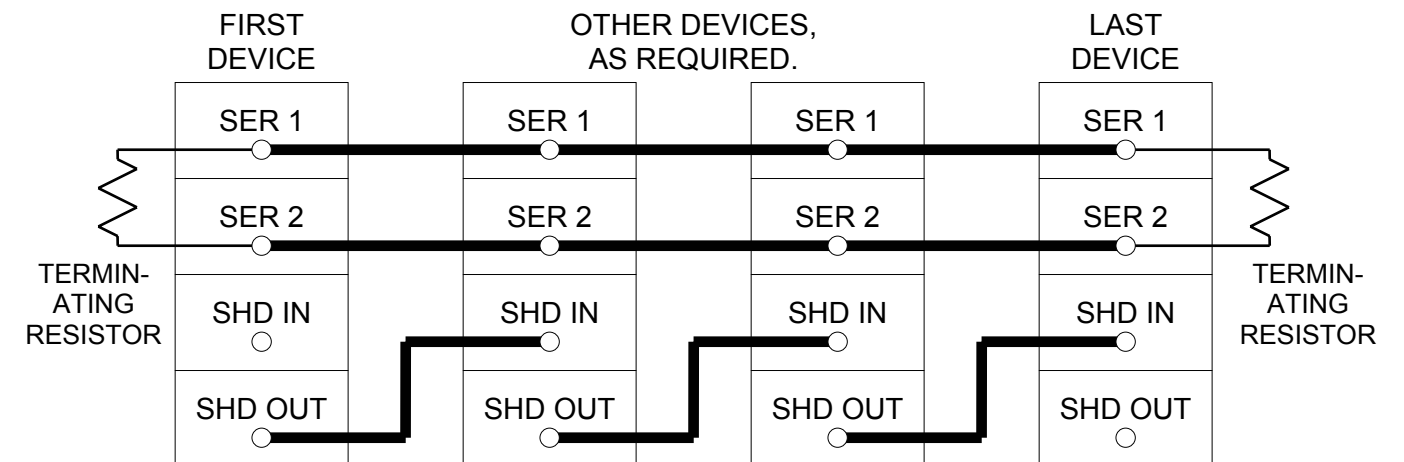
Baud rate is the rate at which devices on the bus communicate. The same baud rate must be used for each device on a bus. A Baud rate of 153.6 Kbaud extended is preset by Virginia Controls. This provides the best compromise between communication speed and data integrity. To change the Baud rate, the EPROM in the CPU must be changed.

BUS INSTALLATION

The bus is connected to the terminal assembly on the front of the Genius Communications module. Connection can be made to any of the terminals in a group. (The Serial 1 and Serial 2 terminals are interconnected on the board, not on the terminal strip). (See table below and label on Module.) Each terminal will accept up to one AWG #14 wire or two AWG #16 wires using ring or lug-type connectors. Incoming and outgoing Serial 1 wires and Serial 2 wires can be connected to the same terminal, or to two different terminals. Connecting these wires to one Serial 1 terminal and one Serial 2 terminal is recommended since this will allow removal of the Terminal Assembly without powering down the bus. Wires are routed to and from the terminals out of the bottom of the Terminal Assembly cavity.

TERMINAL NUMBER	LABEL NAME	DESCRIPTION
1, 2, 3, 4, 5	SER 1	SERIAL DATA LINE #1
6, 7, 8, 9, 10	SER 2	SERIAL DATA LINE #2
11, 12, 13, 14, 15	SHD IN	SHIELD IN (from previous module)
16, 17, 18, 19, 20	SHD OUT	SHIELD OUT (to next module)

Using the cable type selected for the application, connect the Serial 1 terminals of adjacent devices and the Serial 2 terminals of adjacent devices. Connect Shield In to the Shield Out terminal of the previous device. For the first device on the bus, Shield In is not connected. For the last device on the bus, Shield Out is not connected. (See diagram below.)



TERMINATING THE BUS

The bus must be terminated at both ends by its characteristic impedance. Refer to the table of cable types above for the termination requirements of each cable type. Install resistors of the appropriate impedance across the Serial 1 and Serial 2 terminals of the first and last device on the bus. 100ohm resistors have been provided by Virginia Controls. If this does not match the impedance of the cable being used, these resistors **MUST** be changed to the correct impedance.