
INTECH Micro 2100-NS Rev REV 1.1.



Installation Guide.

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2100-4S Installation Guide Index.**

Section A. Description, Ordering and Specifications.

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2100-NS Rev1.1 RS232 to RS422/485 Converter.

Converts RS232 from a computer to RS422/485 for communication to a field Datalogging system.

Features.

- Easy to Install.
- LED Status Indications.
- Compact Interface Module.
- Low Cost.
- RS422 or RS485 Selectable.
- Complete With a 9/25D Serial Cable & AC/DC Adapter.



2100 models include:
 2100-4S : RS422 to RS485 Converter.
 2100-A16 :16AI, 4DI, 2 Relay Out, 2 AO.
 2100-A4 :4AI, 4DI, 4 Relay Out, 2 AO.
 2100-A4e :4AI, 4DI, 8 Relay Out, 2 AO.
 2100-AO :8 AO, 8 AI, 12 DI, 2 Relay Out.
 2100-D :12DI, 12 Relay Out.
 2100-IS :Isolated RS232 to RS422/485.
 2100-M :16AI Multiplexer.
 2100-ME :Memory Expansion for 2100-A.
 2100-NET :Isolated Ethernet to RS232/422/485.
 2100-NS :Non-Isolated RS232 to RS422/485.
 2100-R :16 Relay Expansion for 2100-A.
 2100-RL2 :2 Relay Expansion for 2100-A.

Ordering Information.

Standard Unit:

2100-NS Non Isolated RS232 to RS422/485 Converter.
 Supplied configured for RS485.

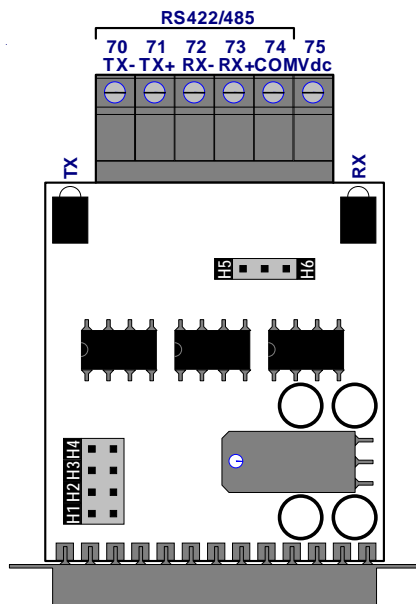
Accessories:

2100-IP RS232 Cable for Parallel Connection of up to Four 2100-NS Convertors.
2100-IB Adaptor Kit for Boosting RS485.

Description.

The 2100-NS is a compact interface Module that converts RS232 from a computer to RS422/485, for communication to a field data logging system. Its driver and receiver meet EIA standards RS-422-A and CCITT recommendations V.11 and X.27, and are designed for multipoint transmission on long bus lines in noisy environments. It includes thermal shutdown and over current limiting. It is powered by an external AC/DC adapter, making it suitable for working with many types of PCs and PLCs. It comes complete with the AC/DC adapter, and a 200mm 25way to 9way adapter cable for the PC.

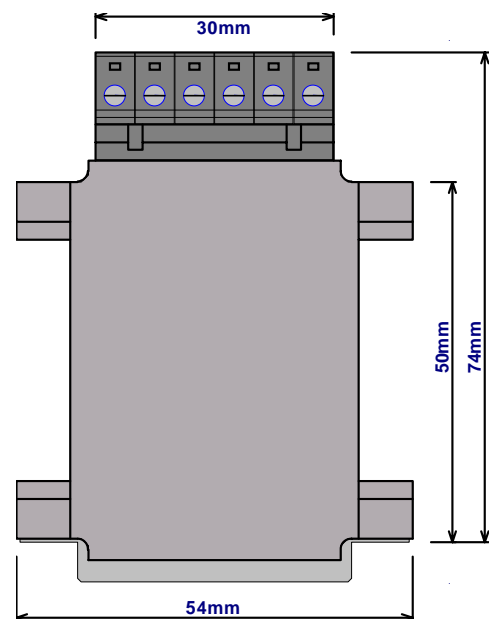
2100-NS Board Layout.



2100-NS Terminations.

2100-NS Terminals	
Term No	RS485
70	TX- (RS485-)
71	TX+ (RS485+)
72	RX-
73	RX+
74	COM
75	9Vdc, 200mA

2100-NS Dimensions.



Quality Assurance Programme.

The modern technology and strict procedures of the ISO9001 Quality Assurance Programme applied during design, development, production and final inspection grant long term reliability of the instrument. This instrument has been designed and built to comply with EMC and Safety Standards requirements.

2100-NS Specifications.

Comms Baud Rate	-Standard	9600baud.
	-Optional	4800 or 2400baud.
Power Supply	8Vdc Min to 10.5Vdc Max with 200mA load. Max ripple 1Vp-p. Comes complete with AC/DC Adaptor, refer specifications below.	
EMC Emissions Compliance	EN 55022-A.	
EMC Immunity Compliance	EN 50082-1.	
Safety Compliance	EN 60950.	
RF Immunity	<±1% Effect FSO Typical.	
Operating Temperature	0~60C.	
Storage Temperature	-20~80C.	
Operating Humidity	5~85%RH Max. Non-Condensing.	
Dimensions (Convertor Only)	L=75, W=55, H=20.	
Weight	600g. (Includes AC/DC Adapter, Cables, and Packaging).	

AC/DC Adapter Specifications.

Model	PSA9V2.
Input Voltage	230/240Vac ±10%; 50mA; 50/60Hz.
Output Voltage	9Vdc, 200mA
Australian Approval	N14866.
Polarity	White Stripe = +Ve.

Product Liability. This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units at 25C, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.

Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independant fail-safe back-up system must always be implemented.

Section B. LED and Switch Functions Tables.

Description of LED Functions.

R.X.	LED	ON	Unit Receiving Data From the Field.
T.X.	LED	ON	Unit Transmitting Data to the Field.

Description of Jumper Settings.

* For ALL programming tables. Jumper Status: 0=JUMPER NOT INSERTED 1=JUMPER INSERTED.

RS422/485 Mode Settings					
Jumpers	422 Microscan	485 Microscan	485 RTS Ctrl	485 Modbus	Factory Test
H1	1	1	0	0	1
H2	0	0	0	1	1
H3	0	1	1	1	
H4	0	1	1	1	
H5	0	1	1	1	
H6	1	0	0	0	

Notes

1. The 2100-NS is designed for Half Duplex operation. While the Transmitter is on, the receiver can't hear any data. Thus the attached devices must wait for the TX to turn off before sending their data back. When in RS485 mode this means the receiver will not hear the computers own data being sent.

2. The RTS control mode allows the software to turn the transmitter on when the RTS signal is used.

When RTS is ON, the transmitter is ON, when RTS is OFF the transmitter is OFF.

NOTE; when the transmitter is ON; no RX data will be received

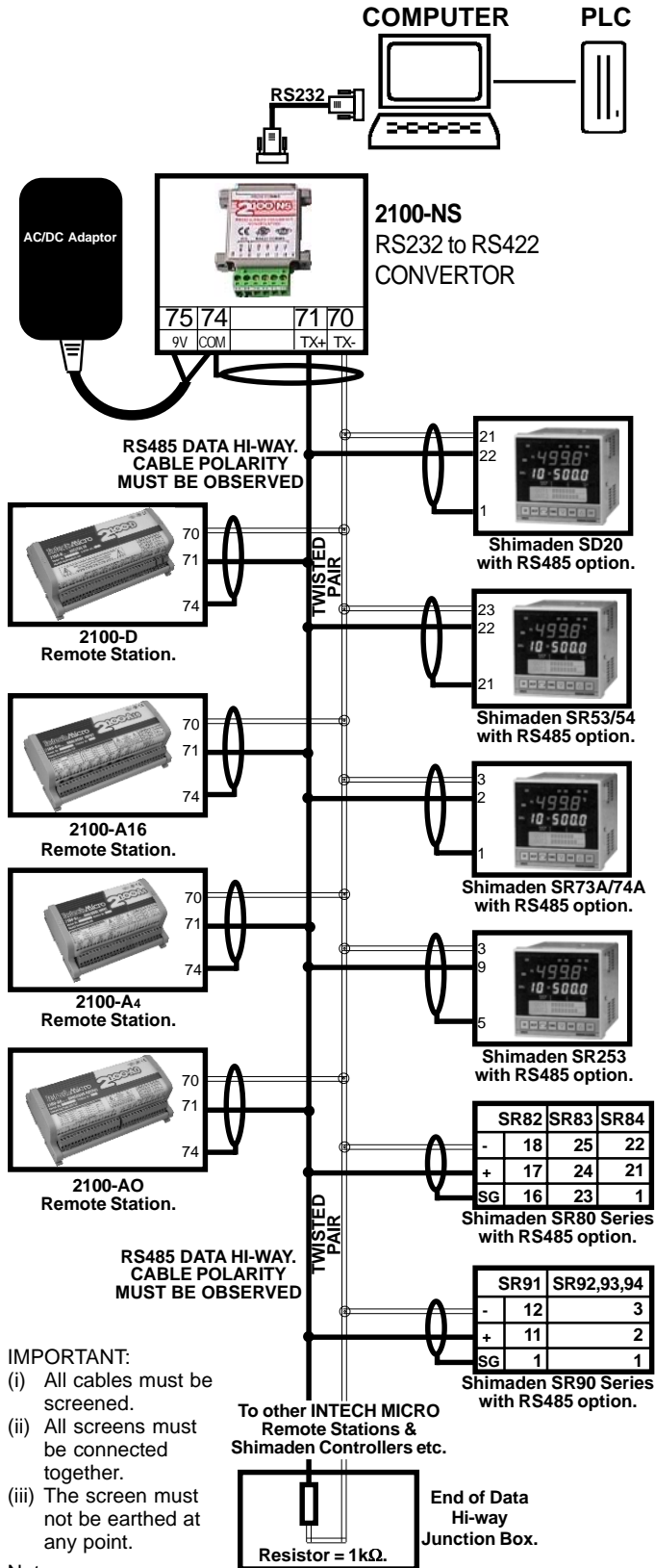
3. The TXE auto settings turn the transmitter on when TX Data is first detected, then wait the selected time interval before turning the transmitter off again, if any more TX activity is detected, the time interval is started again until no more TX data is found i.e the time interval starts timing out after the last TX character has been sent. This mode will not work at 19200 baud. This mode is designed to work with off with factory set 2100-XX stations, with their TXE delays set to 10 (which is 25mSec)

4. The TXE LED inside the 2100-NS is ON when the transmitter is ON (transmitter active, receiver idle)

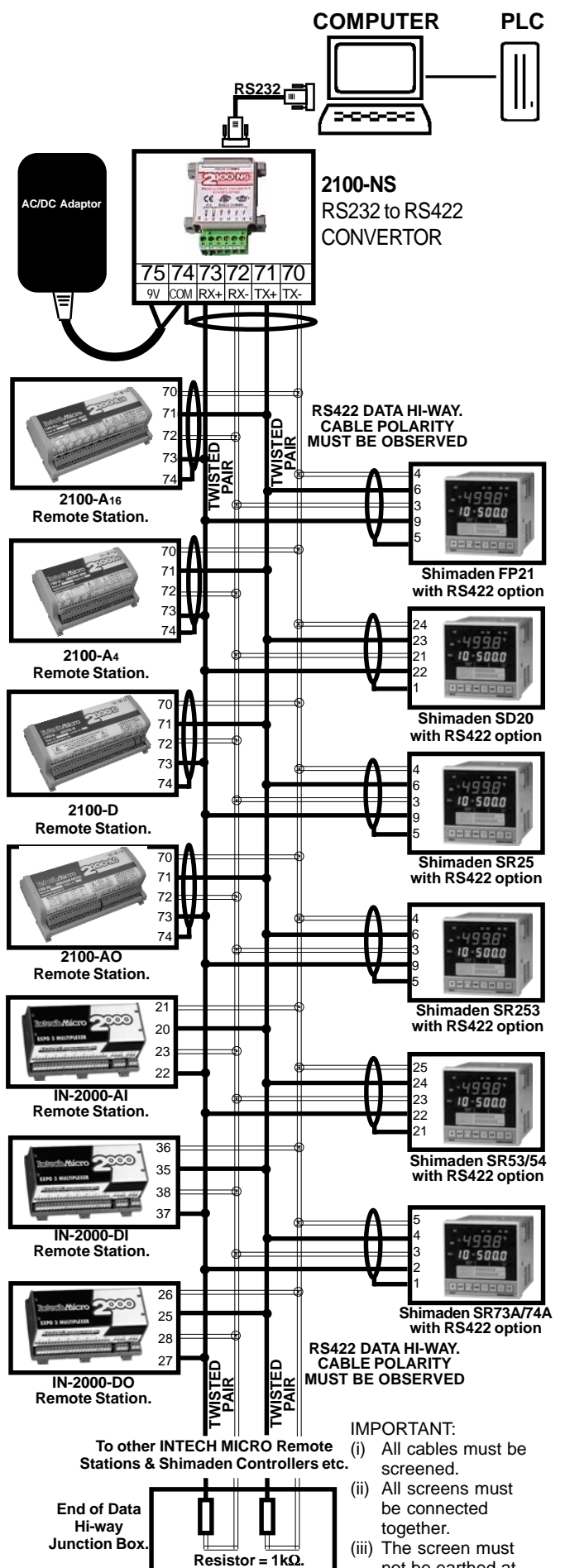
- | | | |
|----|---|--|
| 5. | H1 = 0, H2 = 0. TXE controlled by RTS (Pin 4 DB25); | H1= 0, H2= 1. TXE Auto, 4msec delay. |
| | H1 = 1, H2 = 0. TXE Auto, 15msec delay. | H1 = 1, H2 = 1. Factory Test, TXE Flash, 1 Hz. |
| | H3 = 0, H4 = 0. RS422 Mode. | H3 = 1, H4 = 1. RS485 Mode. |
| | H5 = 0, H6 = 1. RX Permanently On, | H5 = 1, H6 = 0. RX Automatic. |

DO NOT GUESS TX OR RX CONNECTIONS. FOLLOW THE TERMINAL NUMBERS IN THE SERIAL CONNECTION DIAGRAMS EXACTLY.

OUTSTATION LAYOUT. 2-Wire RS485 Serial Connections.



OUTSTATION LAYOUT. 4-Wire RS422 Serial Connections.

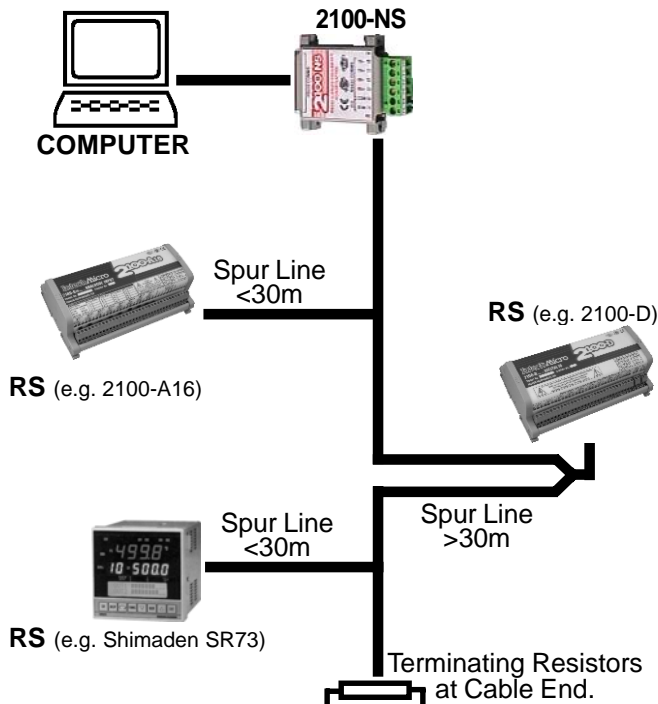


RS232: 2100-IS convertor is not required to connect the 2100-232 directly to a PC. Use the RS232 kit to connect the 2100-232 directly to a PC. The PC requires one RS232 port per 2100.

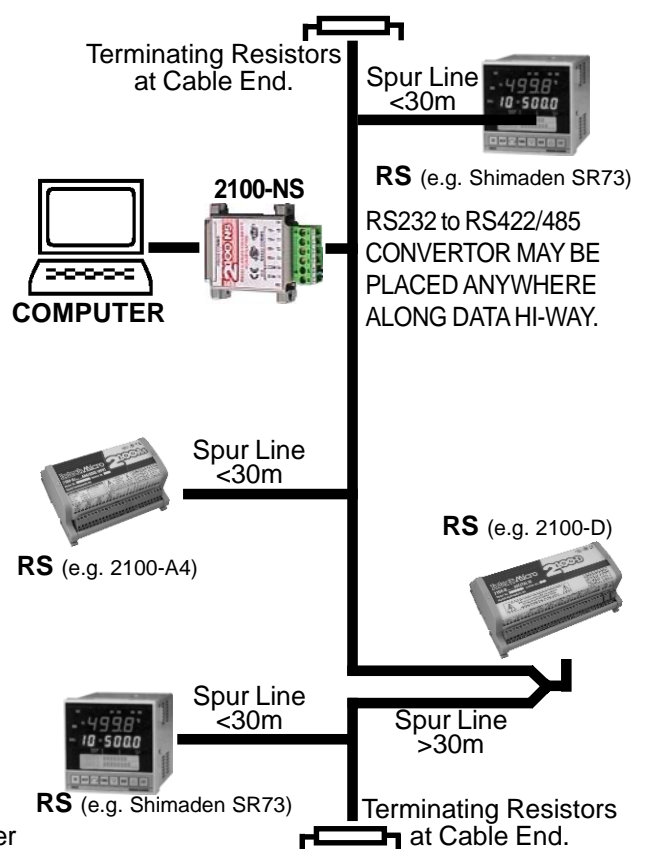
RS485: If the outstation is using RS485, it cannot be connected to the same data hi-way as an outstations using RS422. In the 'programming' box, set the 'TX delay' box to 20. Set the Dip switches on the 2100-IS and the jumpers on the 2100 for RS485 operation.

**Section C. Connection to a Microscan Scada System.
2100 SCADA.**

RS422/485 Data Cabling Installation eg 1.



RS422/485 Data Cabling Installation eg 2.



Note 1: **RS** = Micro 2000 or 2100 Remote Stations, or Shimaden controllers.

Note 2: Shimaden Controllers must have a unique serial number preprogrammed before connecting to the COMMS data hi-way.

All signals and power must be de-energised before connecting to any wiring.

IMPORTANT: The accompanying Installation Instructions must be strictly adhered to.

Terminations for all Models of 2100-IS / 2100-NS / IN-2000-IS.

Model	Terminations									
	2100-IS Rev 1.1		2100-IS		2100-NS Rev1.1		IN-2000-IS Rev.2		IN-2000-IS Rev.0, Rev.1	
	Term No	Connection	Term No	Connection	Term No	Connection	Term No	Connection	Term No	Connection
Mains Supply			93	230Vac			1	Phase(24-230Vac)	1	23 0Vac
			92	115Vac			2	Neutral	2	115Vac
			91	Neutral			3	Earth	3	Neutral
			90	Earth			4	Earth	4	Earth
Alarm Relay	62	N.C.	62	N.C.			5	N.C.	5	N.C.
	61	N.O.	61	N.O.			6	N.O.	6	N.O.
	60	COM	60	COM			7	COM	7	COM
RS422 (RS485)	75	9Vdc, 200mA			75	9Vdc, 200mA	8	0V	8	0V
	74	COM	74	COM	74	COM	9	RX+	9	RX+
	73	RX+	73	RX+	73	RX+	10	RX-	10	RX-
	72	RX-	72	RX-	72	RX-	11	0V	11	0V
	71	TX+ (RS485)	71	TX+ (RS485)	71	TX+ (RS485)	12	TX+	12	TX+
	70	TX- (RS485)	70	TX- (RS485)	70	TX- (RS485)	13	TX-	13	TX-

2100-NS Pinout of DB25 Connector.

2100-NS = DCE. (Data Communications Equipment.)

2100-NS DB25 Connector				
Pin Name	Signal Name	Direction	Pin No.	H2 STD
TX	Transmitted Data	In	2	TX
RX	Received Data	Out	3	RX
RTS	Request to Send	In	4	TXE
CTS	Clear to Send	Out	5	CTS
SG	Signal Ground	-	7	0V
DSR	Data Ready to Send	In	6	
CD	Carrier Detect	Out	8	
DTR	Data Terminal Ready	Out	20	
RI	Ring Indicator	N/C	22	N/C

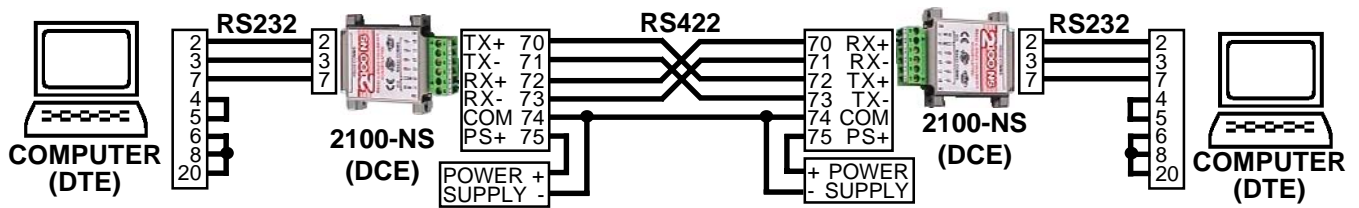


RS232 Booster Connection Diagram.

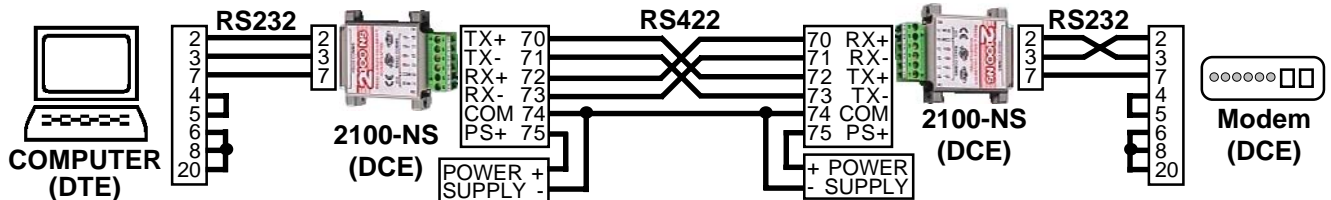
Where the RS232 is required to exceed it's specified cable length of 15m, two or more 2100-NS' can be used to extend the signal up to 1200m. (To extend further refer to the following section, using the 2100-IB Booster Adapter.)

Note. This cannot be used for hardware handshaking.

1/ Computer to Computer.



2/ Computer to Modem.

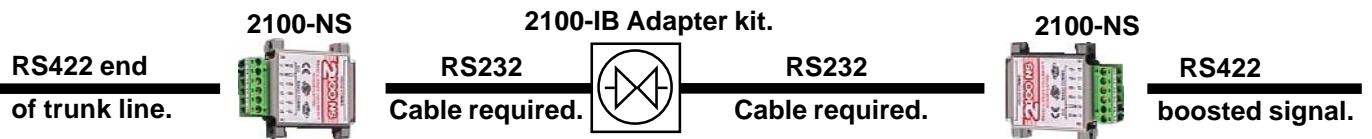


Note 1. Before wiring up confirm whether your equipment is 'DCE' or 'DTE'.

Note 2: The booster can only be used to extend a 1:1 link. To create a 1:N link a 2100-IS unit must be used as they incorporate TXE control.

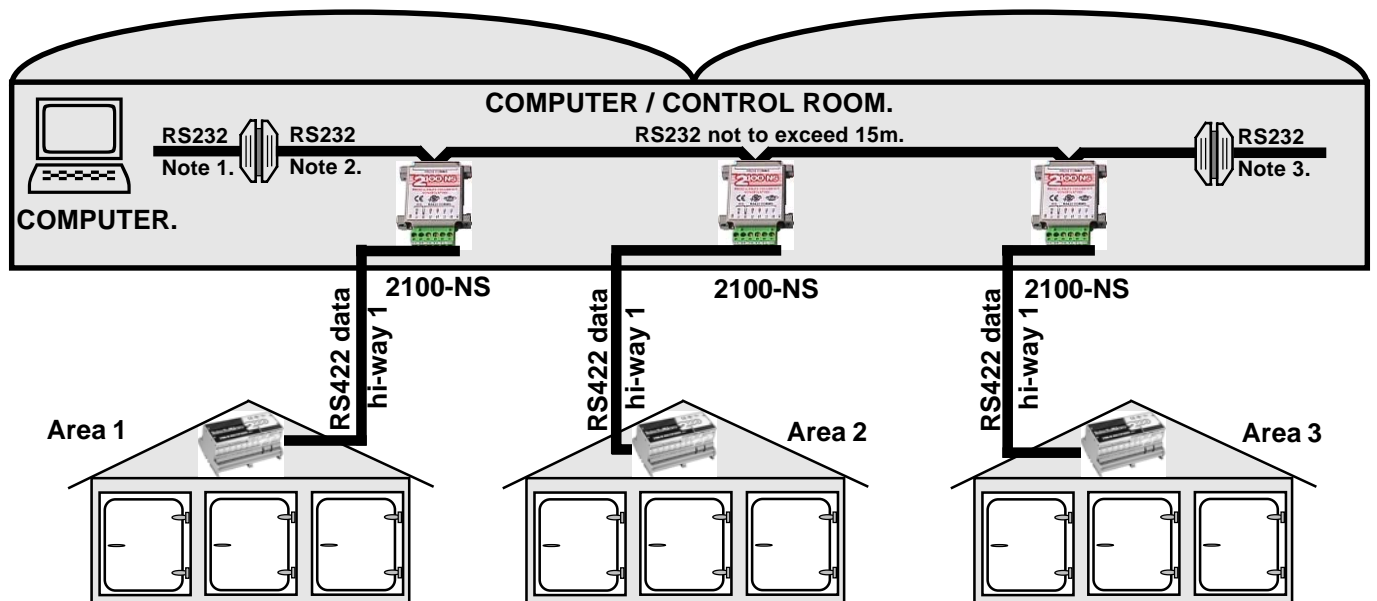
RS422 Booster Connection Diagram.

Where the RS422 Data Hi-way exceeds 1200m it is necessary to boost the signal.



Parallel Connection of RS232 to Multiple 2100-NS.

Used in situations where the RS422 Data Hi-way is going in different directions in a plant. Up to six 2100-NS' can be connected in this configuration. If the overall Data Hi-way does not exceed 1200m, one 2100-NS should be sufficient.



Note.

- (1) RS232 Cable is required.
- (2) 2100-IP RS232 cable for parallel connection of up to four 2100-NS convertors.
- (3) For connection of more than four 2100-NS', two 2100-IP cables can be connected together.
- (4) This mode is not to be confused with the interfaces "Dual Port Mode" which is used to access more than 32 Shimaden Controllers on two serial ports.
- (5) Do not parallel a 2100-NS with an IN-2000-IS.

The Proper Installation & Wiring of the 2100-NS.

All power and signals must be de-energised before connecting any wiring, or altering any Jumpers or Dip Switches.

Mounting.

- (1) Mount in a clean environment.
- (2) Do not subject to vibration, excess temperature or humidity variations.
- (3) Avoid mounting near power control equipment.

Cover Removal and Fitting.

To access the Jumpers in the 2100-NS, loosen the two nuts on the DB25 connector. Insert a small screwdriver between one of the four side clips and the side wall to separate. Repeat for the other three clips and remove the cover.

To re-assemble ensure the DB25 screws and nuts are aligned. Replace the top cover, ensuring the 'RS232 COMMS' end of the cover is above the DB25. Push the cover down until all four clips locate securely into position. Tighten the DB25 nuts.

Analogue Signal Cabling.

- (1) All analogue cables should be good quality, overall screened, INSTRUMENTATION CABLE, with the screen earthed at one end only. (e.g. Austral Standard Cables B5102ES.)
- (2) Analogue signal cables should be laid a minimum distance of 300mm from power and data cables.
- (3) It is recommended that you do not ground current loops or use power supplies with ungrounded outputs.
- (4) Lightning arresters should be used on inputs and outputs when there is a danger from this source.
- (5) Refer to diagrams for connection details.

RS422/485 Comms Signal Cabling.

- (1) Use only low capacitance, twisted pair, overall screened data cable. The cable must equal or better the following specifications.

Cable Specifications.		
Conductor Size.		7/0.20mm, 24AWG
Conductor Resistance @ 20C.		8.9Ω/100m
Max. Working Voltage.		300Vrms
Capacitance between wires of a pair.		50pF/m
Capacitance between each wire to all others bunched together.		95pF/m
Cross-talk between pairs:	@ 1kHz	>-90dB/100m
	@ 100kHz	>-50dB/100m
Characteristic Impedance .	@ 100kHz	135Ω
Attenuation of a pair:	@ 1kHz	0.15dB/100m
	@ 10kHz	0.42dB/100m
	@ 100kHz	0.8dB/100m
	@ 50kHz	0.9dB/100m
	@ 1MHz	1.9dB/100m
	@ 1.5MHz	2.4dB/100m

NOTE: All cables are to be subject during manufacture to in-process spark testing @ 4kVrms.
All cables are to be tested between conductors and conductors to screen for 1min @ 1500Vrms.

- (2) Minimum cable pairs: RS422 = 2. (Plus overall screen.) RS485 = 1. (Plus overall screen.)
- (3) Take care not to stress or damage cables during installation.
- (4) Total length of trunk line, including spurs, is not to exceed 1200m without isolating boosters.
- (5) Terminating resistors -1kΩ.
- (6) Cabling paths should avoid sources of radio frequency interferences such as fluorescent lights, variable speed motor drives, welding equipment, radio transmitters, etc.
- (7) There should be a minimum of 200mm physical separation between power cables and data cables.
- (8) Data cables should not be exposed to excessive heat or moisture, and should not be buried directly in the ground without protection.
- (9) Avoid powering a remote station or controller from the same power supply as a variable speed drive.
- (10) All unused twisted pairs should be terminated at both ends with 1kΩ resistors. DO NOT ground unused pairs.

Commissioning.

- (1) Check that all the above conditions have been met, and the wiring checked, before applying power to the 2100-NS.
- (2) Check each relay output functions correctly, and the relay specifications are not being exceeded.

Intech INSTRUMENTS LTD
www.intech.co.nz
 Christchurch Ph: +64 3 343 0646
 Auckland Ph: 09 827 1930
 Email: sales@intech.co.nz