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# INTECH Micro 2100-IS Rev 1.1.



## Installation Guide.

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## **Section A. Description, Ordering and Specifications. 2100-IS Installation Guide Index.**

### **Section A. Description, Ordering and Specifications.**

Index.	Page 2
Features and Ordering Information.	Page 3
Specifications.	Page 4
Circuit Board Layout.	Page 4

### **Section B. Switch and LED Functions Tables.**

Description of LED Functions.	Page 5
Description of Alarm Function.	Page 5
S1 Selectable Alarm Time Delays.	Page 5
S2 Description of Switch Settings.	Page 5
422/485 Mode Settings.	Page 5

### **Section C. Connection to a Microscan Scada System.**

RS485 Serial Connection.	Page 6
RS422 Serial Connection.	Page 6
RS422 Data Cabling Installation Examples.	Page 7
Terminations for all Models of 2100-IS / 2100-NS / IN-2000-IS.	Page 7
RS232 Booster Connection Diagram.	Page 8
RS422 Booster Connection Diagram.	Page 8
Modem Connection Diagrams.	Page 8
Parallel Connection of RS232 to Multiple 2100-IS'.	Page 9
2100-IS RS232-1 / RS232-2 Pinout.	Page 9

### **Section D. Wiring and Installation.**

Mounting.	Page 10
Cover Removal and Fitting.	Page 10
Analogue Signal Wiring.	Page 10
RS422/485 Comms Signal Cabling.	Page 10
Commissioning.	Page 10

# 2100-IS Rev 1.1 RS232 to RS422\485 Converter.

Converts and Isolates RS232 from a computer to RS422 or RS485 for communication to a field Datalogging system.

## Features.

- Audible & Relay Alarms for Communication Failure.
- Easy to Install.
- LED Status Indications.
- Compact Desk Top Box.
- Low Cost.
- Selectable Alarm Time Delays.
- Isolation Between Field Units & Computer.
- Complete With Serial Cable & AC/DC Adaptor.



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-IS** Isolated RS232 to RS422/485 Converter.  
Complete with: -2m RS232 Cable; (5m and 10m available on request)  
-9 way connector for the PC;  
-AC/DC Power Adaptor.

### Accessories:

**2100-IRT-R1** Adaptor for Tait TA348 RF Radio Modem.  
**2100-IRG-R1** Adaptor for Gigatek RDL-201 RF Radio Modem.  
**2100-IM-R1** Adaptor for Standard Telephone Modem.  
**2100-IP-R1** RS232 Cable for Parallel Connection of two 2100-IS Convertors.  
**2100-IB-R1** Adaptor for Boosting RS422/485.  
**2100-IB-R1** Adaptor for PLC.

## Description.

The 2100-IS is a compact, desktop module that isolates and converts RS232 from a computer to RS422 or RS485 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. The 2100-IS includes audible and fail safe alarms of communications failure, with selectable time delays. It is capable of interfacing to telephone modems, and RF modems. It has independent power on both sides of the isolation barrier, making it suitable for working with many types of PCs and PLCs.



2100-IS Front View

## 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.

## Specifications.

Comms Baud Rate	-Standard	9600baud.
	-Optional	4800 or 19200baud.
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.	
Comms Isolation Test Voltage	-Input to Output:	1000Vdc for 1min.
RF Immunity	<±1% Effect FSO Typical.	
Operating Temperature	0~60C.	
Storage Temperature	-20~80C.	
Operating Humidity	5~85%RH Max. Non-Condensing.	
Housing	Desk Top Enclosure.	
Dimensions	L=100mm, W=95mm, H=27mm	
Weight	600g. (Includes Cables, Power Adapter, and Packaging.)	
Alarm Relay Maximum Ratings	1A @ 24Vdc Max Resistive Load.	

## AC/DC Adapter Specifications.

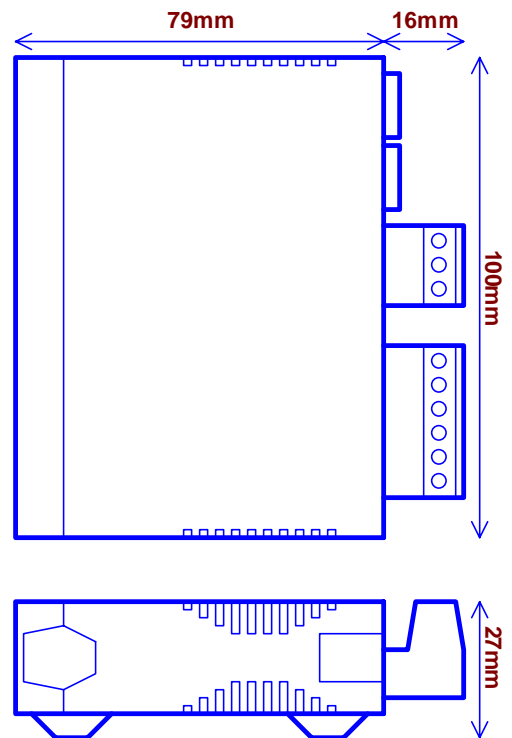
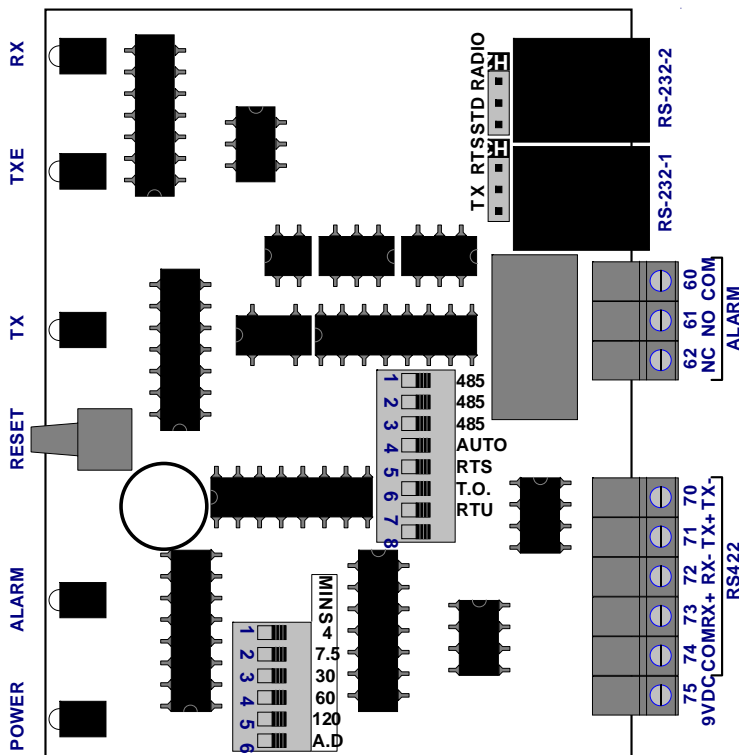
Model	PSA9V2.
Input Voltage	230/240Vac ±10%; 50mA; 50/60Hz.
Output Voltage	9Vdc, 200mA
Australian Approval	N14766.
Polarity	White Stripe = +Ve.

**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.

## 2100-IS Circuit Board Layout.

## 2100-IS Dimensions



## Section B. Switch and LED 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.
T.X.E.	LED	ON	Transmit Enable Line Active.
ALARM	LED	ON	Unit in Alarm.
PWR	LED	ON	Unit has Power Connected.
RESET	Switch		Push this Switch to Reset the Alarm. This does not reset the computer. (See Description of Alarm Function).

### Description of Alarm Function.

Note: In the description below we have selected an alarm time delay of 4 minutes, Audible is active, Relay is active, and Time Out is active.

After approx. 4 minutes of the last RX data having been received the audible, relay and LED alarms activate. If more RX data is received after the unit has gone into alarm the alarms remain active until the RESET button is pushed.

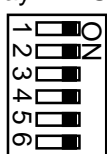
- (1) When the RESET button is pushed the audible, relay and LED alarms reset.
- (2) If after approx. 1 hour of the RESET button being pushed no data has been received the alarm 'times out', and the audible, relay and LED alarms reactivate

Notes:

- (1) To deactivate the audible alarm only, place S1-6 ON.
- (2) To deactivate all audible, relay and LED alarms, place all S1 switches OFF.
- (3) To deactivate the 1 hour time out function, place S2-6 OFF.
- (4) The 2100-IS alarm only activates on a complete COMMS failure of the data being received by the 2100-IS. For additional security use the COMMS failure time out relay alarm. This is a software selectable function available on the 2100-A4, the 2100-A16, the 2100-AO, and the 2100-D.

### S1 Selectable Alarm Time Delays.

6 Way DIP Switch

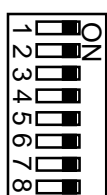


- 1 -Turn on for: 4 minute Alarm Time Delay.
- 2 -Turn on for: 7 1/2 minute Alarm Time Delay.
- 3 -Turn on for: 30 minute Alarm Time Delay.
- 4 -Turn on for: 1 hour Alarm Time Delay.
- 5 -Turn on for: 2 hour Alarm Time Delay.
- 6 -Turn on to Disable the Audible Alarm.

- Notes 1/ Only 1 of DIP switches 1 to 5 should be on at any one time.  
 2/ To disable all the alarms put all S1 DIP switches OFF.  
 3/ All alarm time delays are approximate only.

### S2 Description of Switch Settings.

8 Way DIP Switch



- 1 - ON connects TX to RX.
- 2 - ON connects TX to RX.
- 3 - ON = RX automatic. OFF = RX permanently ON.
- 4 - ON = TXE 20ms automatic switch OFF.
- 5 - ON = TXE under RTS control.
- 6 - ON = alarm 1 hour time out.
- 7 - ON = RTU 5ms automatic switch off.
- 8 - ON = Not Used

- Notes 1/ Only 1 of DIP switches 4 or 5 should be on at any one time.

### 422/485 Mode Settings.

8 Way DIP Switch

S2 RS422/485 Mode Settings.				
DIP Switch	422-Microscan	485-Microscan	485-RTS Control	485-RTU
1	OFF	ON	ON	ON
2	OFF	ON	ON	ON
3	OFF	ON	ON	ON
4	OFF	ON	OFF	ON
5	OFF	OFF	ON	OFF
6	Refer to description of alarm function.			
7	OFF	OFF	OFF	ON
8	OFF	OFF	OFF	OFF

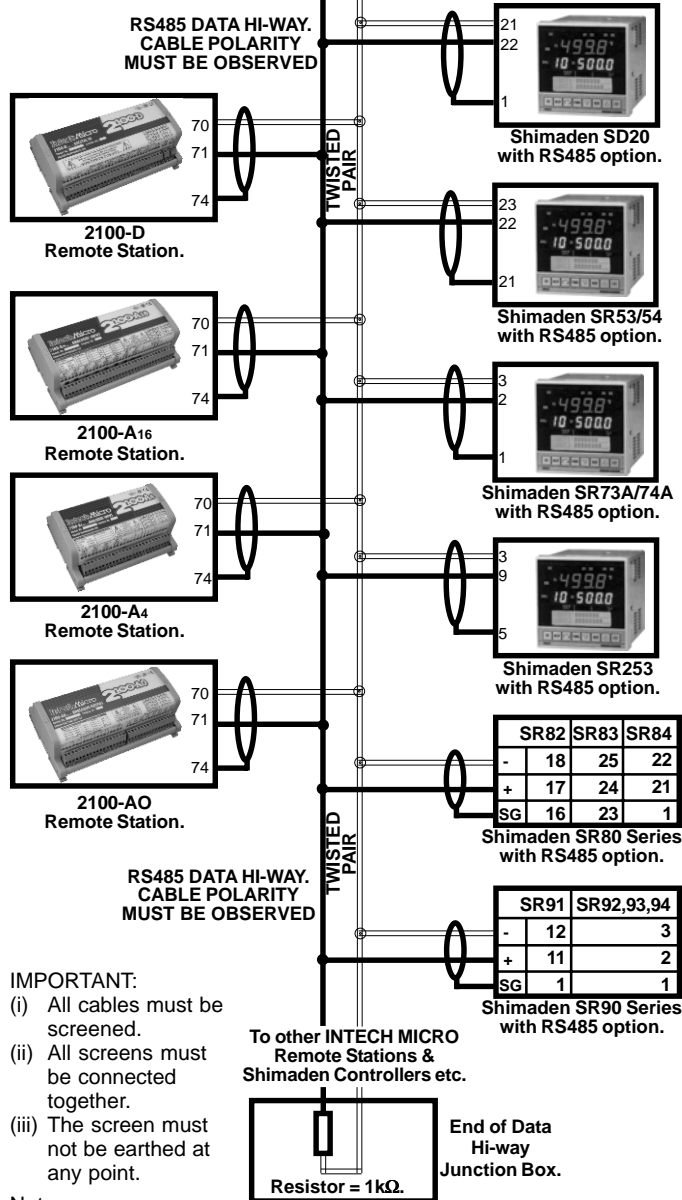
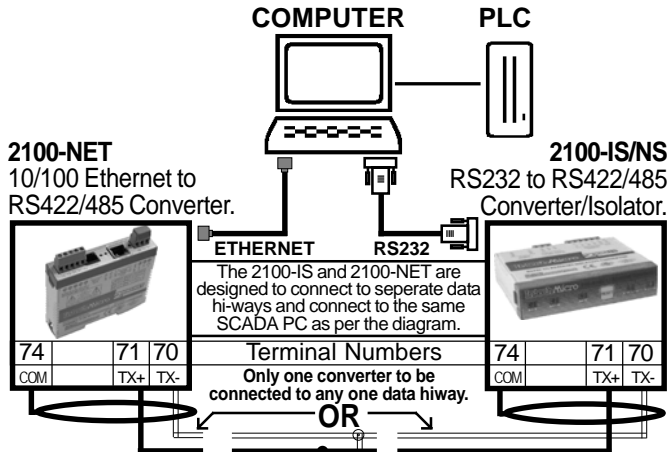
### H3 Jumpers.



RTS: TXE Controlled by RTS. TX: TXE Controlled by TX.  
 Note. Use TX position with 485 loops, when controlling software does not use RTS to control transmitter ON/OFF states.

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

## OUTSTATION LAYOUT. 2-Wire RS485 Serial Connections.



### IMPORTANT:

- (i) All cables must be screened.
- (ii) All screens must be connected together.
- (iii) The screen must not be earthed at any point.

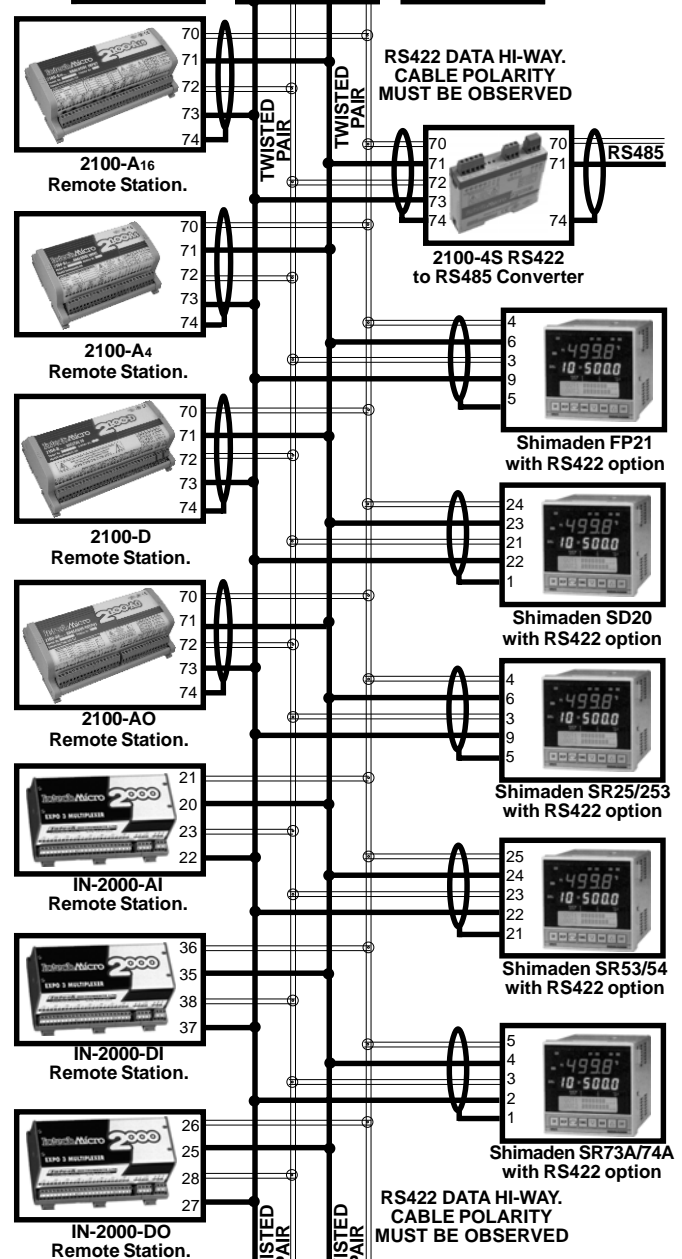
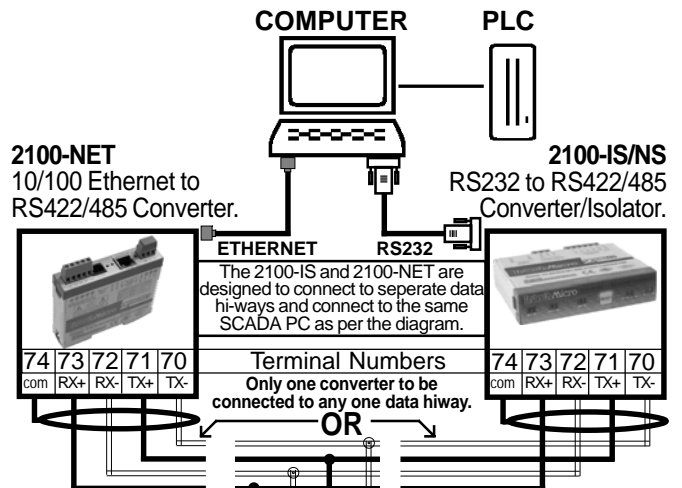
### Notes:

- (i) RS485 can only be used with software release Ver. 4.02 onwards.
- (ii) RS485 Data Hi-way is not compatible with RS422 Data Hi-way devices such as IN-2000-AI, IN-2000-AO, IN-2000-DI, IN-2000-DO, FP21, SR25, etc. Use a 2100-4S to interface an RS485 Data Hi-way to an existing RS422 Data Hi-way

**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.

## OUTSTATION LAYOUT. 4-Wire RS422 Serial Connections.



### IMPORTANT:

- (i) All cables must be screened.
- (ii) All screens must be connected together.
- (iii) The screen must not be earthed at any point.

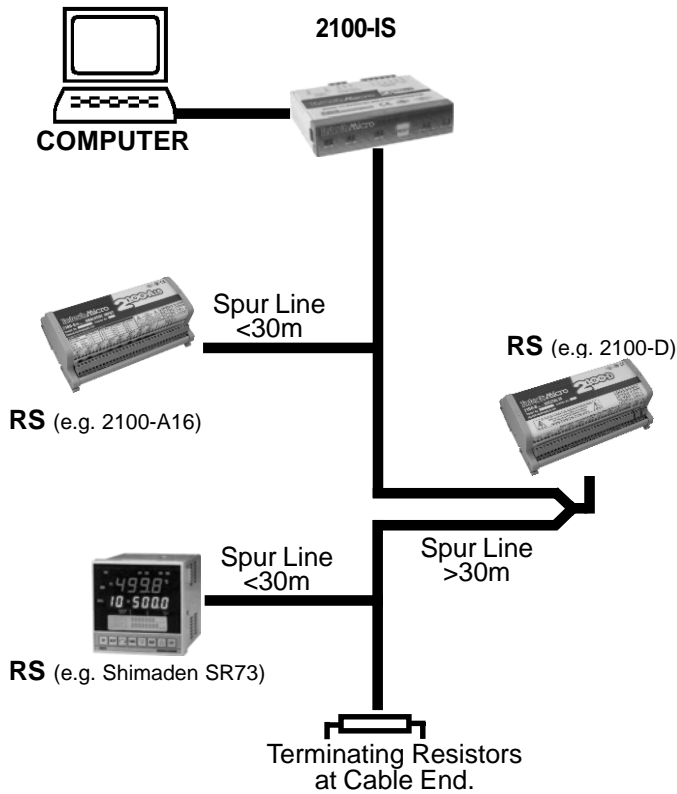
To other INTECH MICRO Remote Stations & Shimaden Controllers etc.

End of Data Hi-way Junction Box.

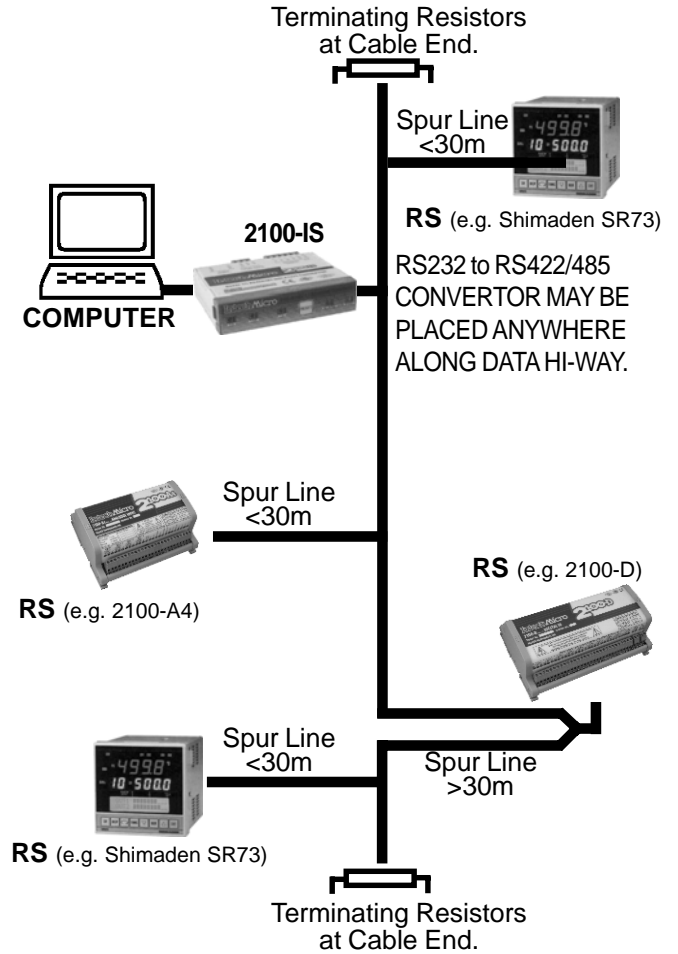
Resistor = 1kΩ.

**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-



### RS232 PLC Connection Diagram.

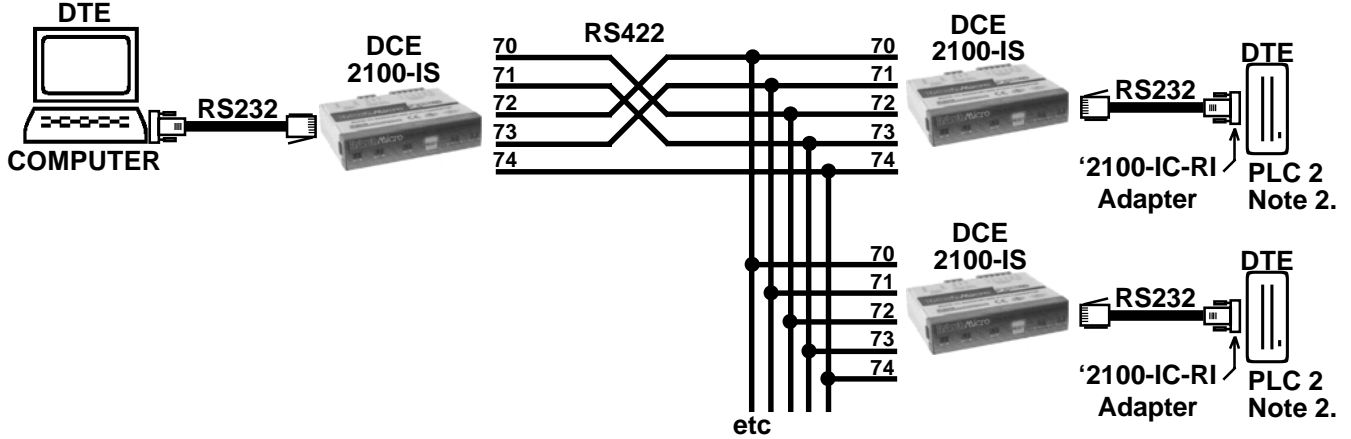
Important: For the following connection diagrams ensure the gender and pinout matches the equipment you are connected to. (Refer '2100-IS RS232-1/RS232-2 Pinout Table'.) Due to the large variety of equipment on the market the adapter supplied may not match your equipment. Refer to Intech Instruments for technical assistance.

Where the RS232 is required to exceed it's specified cable length of 15m, two or more 2100-IS 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 1. This cannot be used for hardware handshaking.

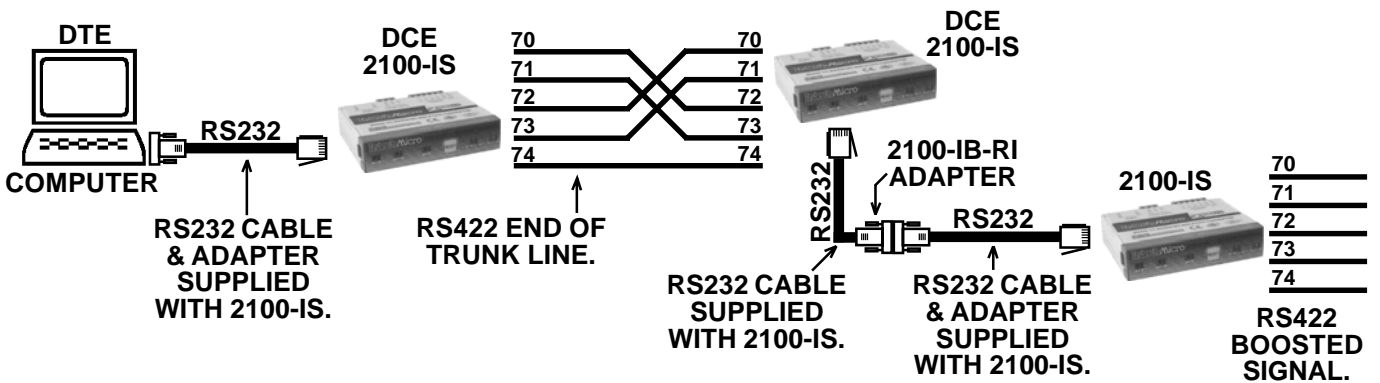
Note 2. PLC to use pin 4 (RS232 RTS) multidrop operation. Set S2-5 'ON'.

### RS232 Booster Connection Diagram.



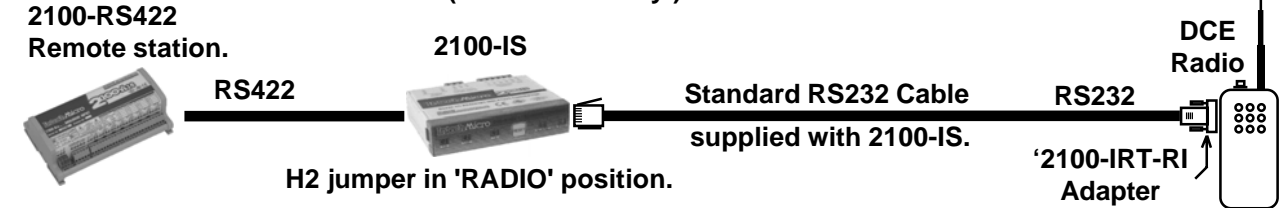
### RS422 Booster Connection Diagram.

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



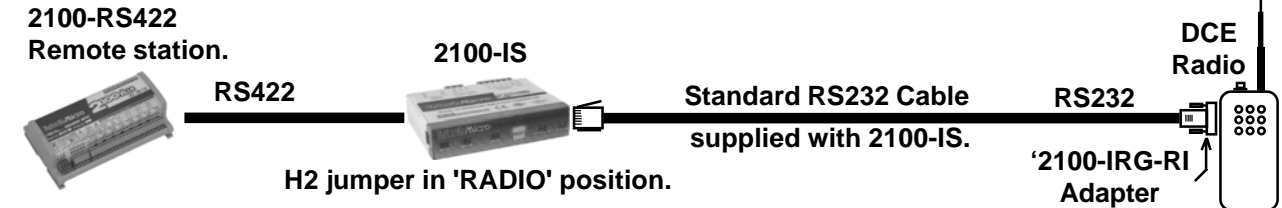
### 2100-IS Modem Connection Diagrams.

Tait TA348 RF modem connection. (Note RS422 only.)



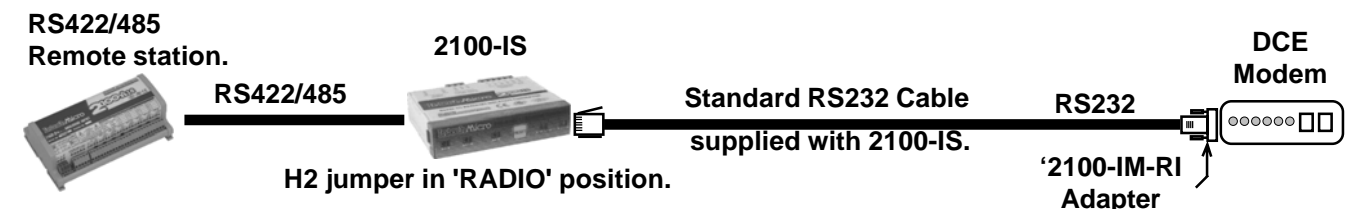
Note: Do not use Shimadem controllers in this configuration.

Gigatek RDL-201 RF modem connection. (Note RS422 only.)



Note: Do not use Shimadem controllers in this configuration.

Standard modem connection.

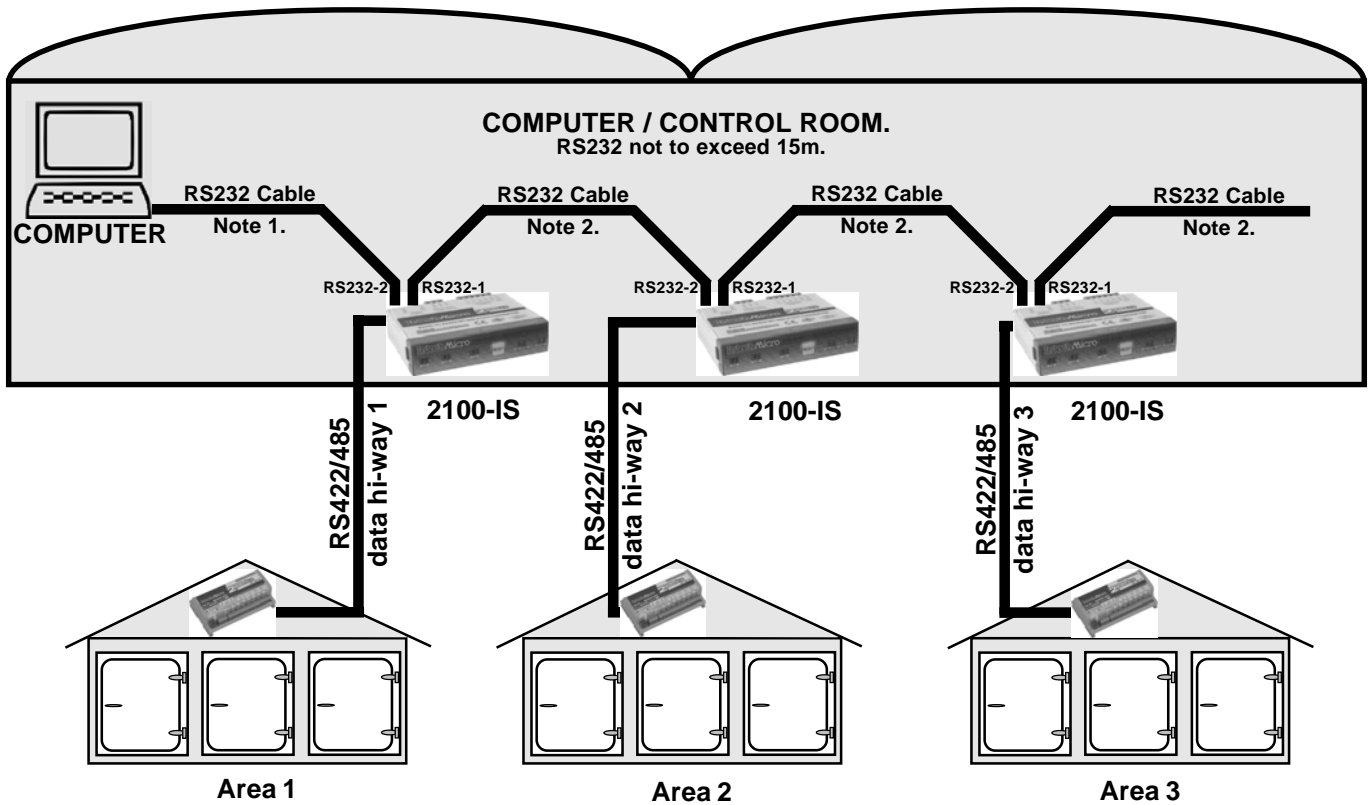




### Parallel Connection of RS232 to Multiple 2100-IS'

Used in situations where the RS422/485 Data Hi-way is going in different directions in a plant. Up to six 2100-IS' can be connected in this configuration.

Note: If the overall Data Hi-way does not exceed 1200m, one 2100-IS should be sufficient.



Note.

- (1) RS232 2m Cable supplied with 2100-IS.
- (2) 2100-IP-R1 RS232 200mm cable for parallel connection of two 2100-IS convertors.
- (3) The total length of all individual RS232 cables must not exceed 15m.
- (4) To use a Shimaden standard protocol controller (RS485) on an RS422 data loop, use a 2100-4S to connect RS485 to RS422 and obtain an updated interface file. (SR25.exe)
- (5) This connection diagram 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.
- (6) To parallel a 2100-IS with an IN-2000-IS remove any jumpers from H2 on the 2100-IS.

### 2100-IS RS232-1 / RS232-2 Pinout.

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

2100-IS RS232-1 / RS232-2 Pinout								
Pin Name	Signal Name	Direction	RJ11	DB9	DB25	H2 STD	H2 RAD	H2 Open
TD	Transmitted Data	In	6	3	2	TX	TX	TX
RD	Received Data	Out	3	2	3	RX	RX	RX
RTS	Request to Send	In	4	7	4	TXE	TXE	TXE
CTS	Clear to Send	Out	1	8	5	CTS	Radio CTS	N/C
SG	Signal Ground	-	2	5	7	0V	0V	0V

Note 1: For position of jumper H2 refer to Circuit Board Diagram, page 4.

Note 2: RS232-1 and RS232-2 are connected in parallel.

**Section D. Wiring and Installation.**  
**The Proper Installation & Wiring of the 2100-IS.**

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) Draft holes must have minimum free air space of 20mm. Foreign matter must not enter or block draft holes.
- (3) Do not subject to vibration, excess temperature or humidity variations.
- (4) Avoid mounting near power control equipment.
- (5) Allow 10mm minimum clearance between the 2100-IS terminals and ANY conductive material.

**Cover Removal and Fitting.**

To remove the PCB to access jumpers and dip switches, push in the GREY BUTTONS at both ends of the enclosure TOP, and slide the PCB from the BASE of the enclosure. To reassemble slide the PCB back into the BASE until both GREY BUTTONS ‘snap’ into place. Ensure the TOP of the enclosure is flush with the BASE on all sides.

**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 @ 100kHz	>-90dB/100m >-50dB/100m
Characteristic Impedance .	@ 100kHz	135Ω
Attenuation of a pair:	@ 1kHz @ 10kHz @ 100kHz @ 50kHz @ 1MHz @ 1.5MHz	0.15dB/100m 0.42dB/100m 0.8dB/100m 0.9dB/100m 1.9dB/100m 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-IS.
- (2) Check each relay output functions correctly, and the relay specifications are not being exceeded.

# NOTES

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