Operating Manual
For
GW2201 Communication Processor

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TABLE OF CONTENTS

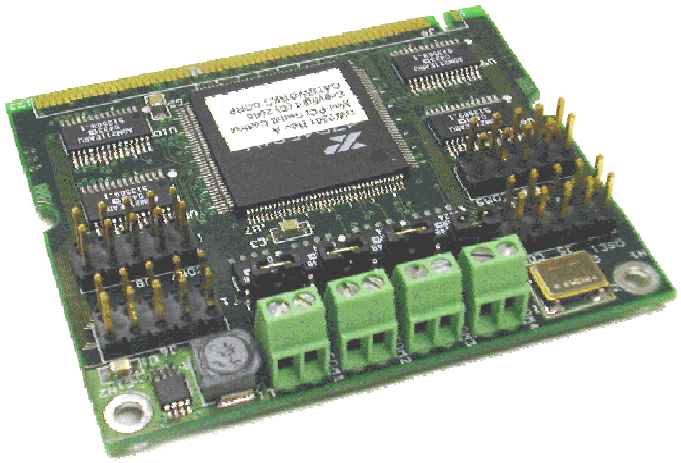
1. INTRODUCTION

1.1. Product Description

The GW2201 is a serial communication expansion module for adding eight serial ports to a Mini-PCI expansion site. The GW2201 includes a 16550 compatible octal serial controller configured with four channels of RS232 and four channels of RS422/485. Each RS232 serial port is available through a 10-pin header with a signal mapping that accepts a standard ribbon cable connection to a PC compatible 9-pin D-shell connector. Each RS422/485 serial port is available in a half-duplex configuration through a 2-pin screw terminal and includes a jumper for enabling end-of-line termination. The GW2201 includes a charge pump for generating the 5V supply required for many of the local devices. This reduces the dependency on Mini-PCI power to 3.3V only.

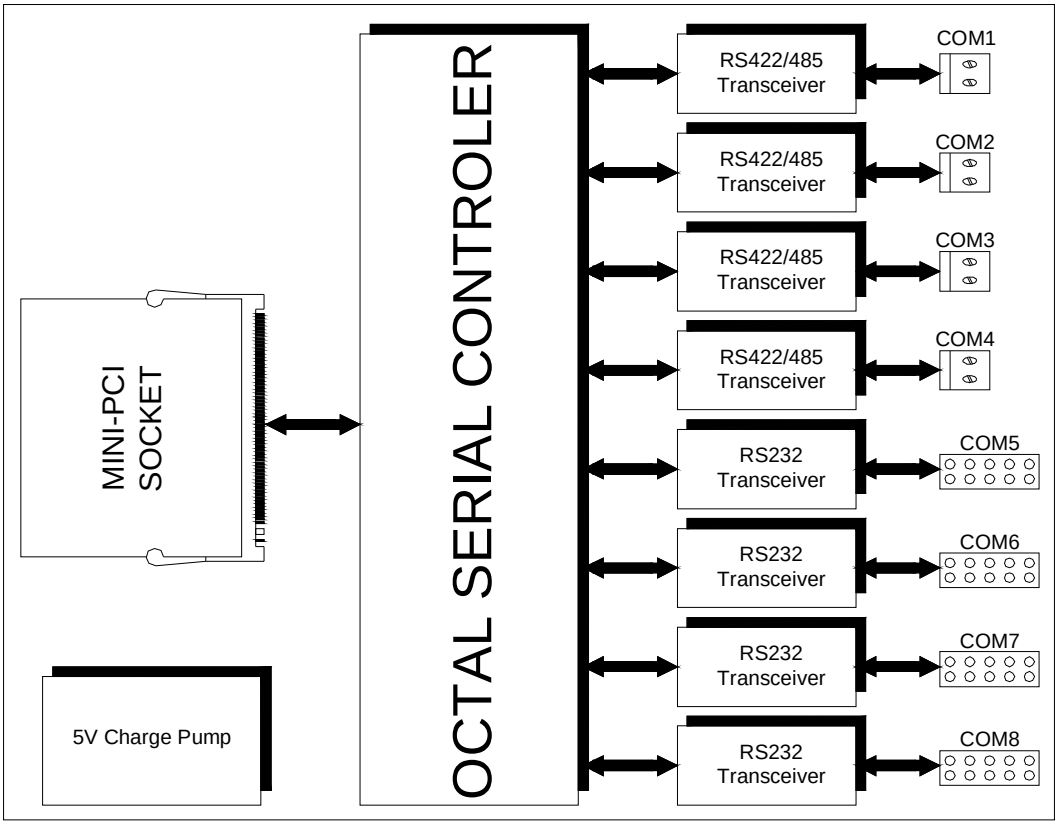
1.2. Standard Features

- 32-Bit PCI Bus 2.3 Target Signaling Compliance
- 3.3V Mini-PCI Type IIIA Form Factor
- Octal Serial Controller
  - 16550 Compatible Register Set
  - 64 Byte Transmit FIFO and Receive FIFO
  - Programmable Transmit and Receive Trigger Level
  - Automatic RTS/CTS or DTR/DSR Flow Control
  - Automatic Xon/Xoff Software Flow Control
  - General Purpose 16-bit Timer/Counter
- Four RS232 Serial Ports
  - Up to 230Kbits Per Second Data Rate
  - PC Compatible Signal Set
  - Standard Mapping to 10-pin Headers
  - ESD Protection to IEC1000-4-2
  - Transient Burst Immunity to IEC1000-4-4
- Four RS422/485 Serial Ports
  - Up to 6.25Mbytes Per Second Data Rate (Limited by serial controller)
  - Half Duplex Signal Set
  - Mapped to 2-pin Screw Terminals
  - DTR Transmit Buffer Control
  - Jumper Selectable End-of-Line Termination
  - ESD Protection to IEC1000-4-2
  - Transient Burst Immunity to IEC1000-4-4
- Fully Operational with 3.3V Mini-PCI Power
- 1 Year Warranty



1.3. Functional Blocks

The functional block diagram for the GW2201 communication controller is shown below followed by a detailed description of each major functional block.



GW2201 Functional Block Diagram

Mini-PCI Interface

Mini-PCI is a small form factor PCI card that uses the same signal protocol, electrical specifications, and configuration definitions as a conventional 32-bit PCI interface. The GW2201 is a Type IIIA Mini-PCI form factor.

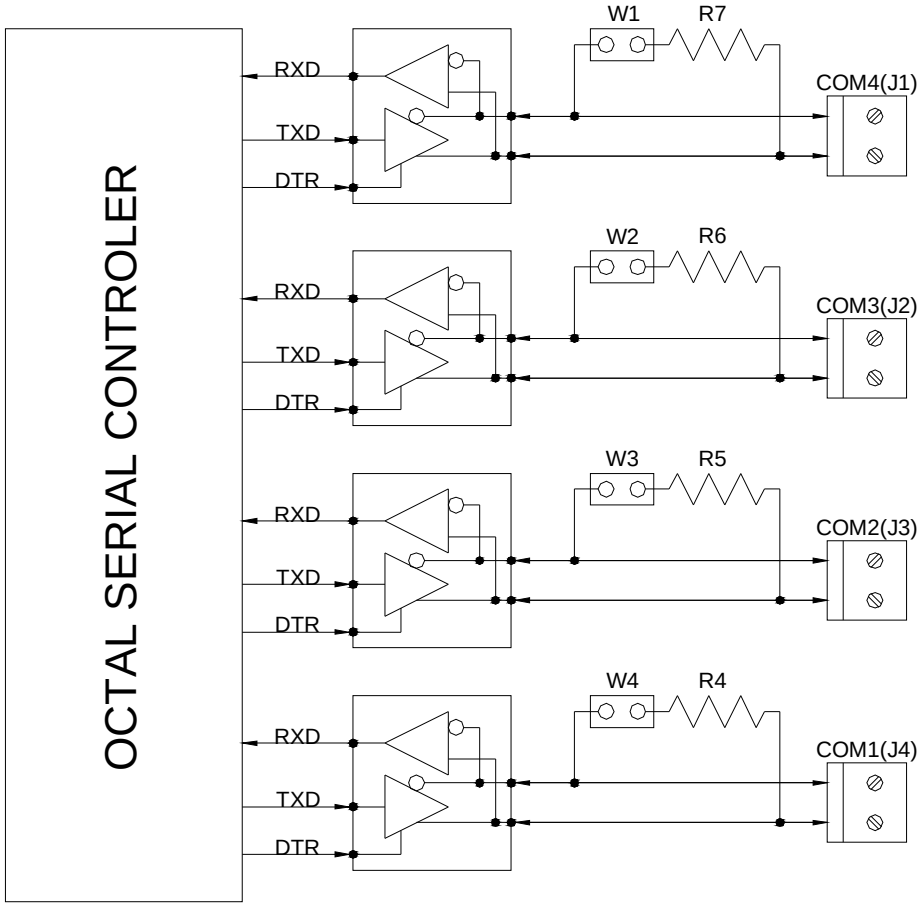
Octal Serial Controller

The Exar XR17D158 is a 32-bit PCI Bus serial controller with 8 serial channels. Each serial channel includes a complete 16C550 compatible set of configuration registers, 64-byte transmit and receive FIFOs, fully programmable transmit and receive trigger levels, automatic RTS/CTS or DTR/DSR hardware flow control with programmable hysteresis levels, and automatic Xon/Xoff software flow control. The serial controller also includes a general-purpose 16-bit counter/timer in addition to the 8 serial ports.

RS422/485 Serial Ports

The lower four serial channels are connected to screw terminals through Analog Devices ADM3485E, or equivalent, RS422/485 transceivers. These low power differential line transceivers comply with both EIA standards for RS-485 and RS-422 in half-duplex operation up to 20Mbps. Note that the RS422/485 data rates are limited to 6.25Mbps by the serial controller. The transceiver includes internal protection against electrostatic discharge (ESD) and electrical fast transients (EFT) to permit operation in harsh environments. A low 19kohm input impedance supports up to 50 transceivers on a single bus. The transceivers also include thermal shutdown to protect against excessive power dissipation caused by bus contention or by shorting the outputs.

A functional diagram of the RS422/485 serial port connection is illustrated below. Each serial port includes a jumper selectable 121ohm end-of-line termination resistor.

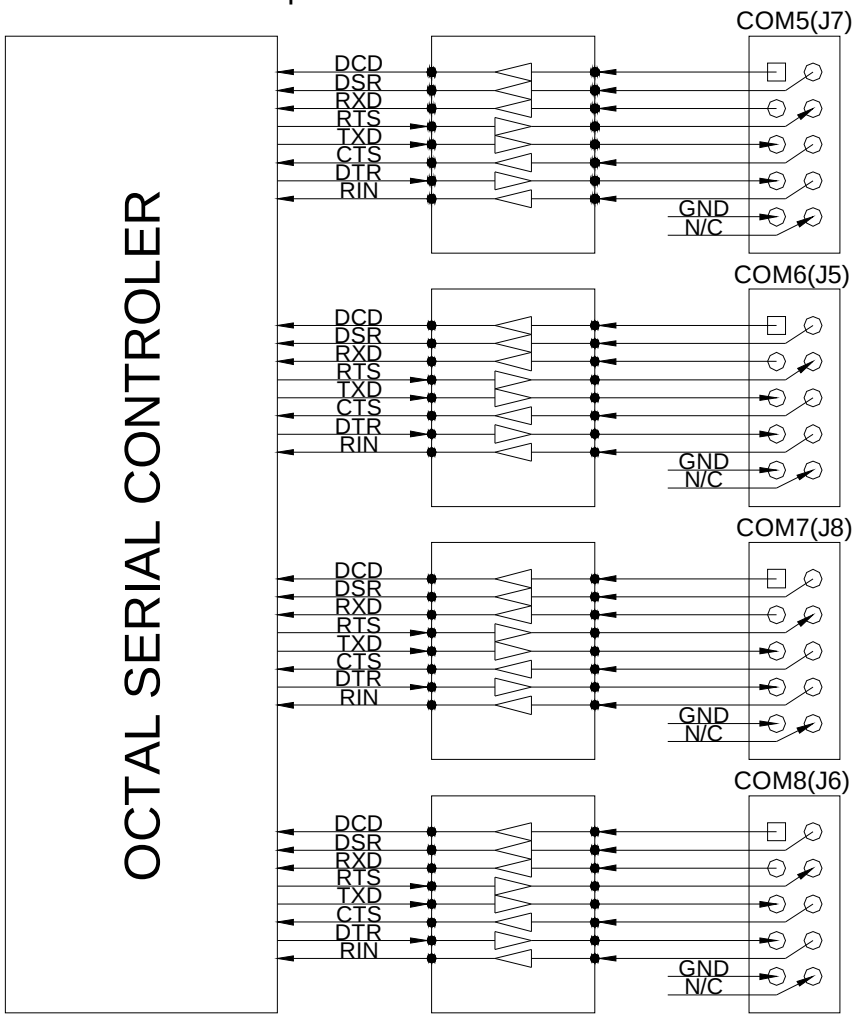


GW2201 RS422/485 Functional Hookup

RS232 Serial Ports

The upper four serial channels are connected to 10-pin headers through Analog Devices ADM211E, or equivalent, RS232 transceivers. These low power devices comply with EIA standards for RS232E and CCITT V.28 for operation up to 230Kbps. The transceiver includes internal protection against electrostatic discharge (ESD) and electrical fast transients (EFT) to permit operation in harsh environments.

A functional diagram of the RS232 serial port connection is illustrated below. The pin assignments selected for the 10-pin header permit a straight ribbon cable connection to a PC standard 9-pin D-shell connector.



GW2201 RS4232 Functional Hookup

5V Charge Pump

A charge pump converts 3.3V to 5V for all of the devices that require the higher operating voltage. This feature reduces the Mini-PCI operating voltage requirements to only 3.3V.

2. CONFIGURATION AND INSTALLATION

This section includes the serial connector pin assignments.

2.1. Octal Serial Controller

The serial controller includes three sets of registers as shown in the figure below. The PCI Local Bus Interface registers are for plug-and-play operation. The plug-and-play feature simplifies GW2201 installation. The second set of registers is for Device Interface. These registers are directly accessible through the 4Kbytes PCI Bus memory address space for configuring device operation and monitoring operating status. This includes interrupt and control status from all eight serial channels and the general-purpose 16-bit counter/timer. The third set of registers is for individual Serial Channel Interface. These registers are also directly accessible though the 4Kbyte PCI Bus memory address space and are used for individual serial channel configuration, control, and status.

The octal serial controller data sheet from Exar includes all of the information needed for device programming. A link to this data sheet is found at the end of this section.

PCI Interface Registers	
Plug and Play	
Automatic Configuration	
Serial Channel COM1	0x0000
Device Interface Registers	0x0080
Serial Channel COM2	0x0200
Serial Channel COM3	0x0400
Serial Channel COM4	0x0600
Serial Channel COM5	0x0800
Serial Channel COM6	0x0A00
Serial Channel COM7	0x0C00
Serial Channel COM8	0x0E00

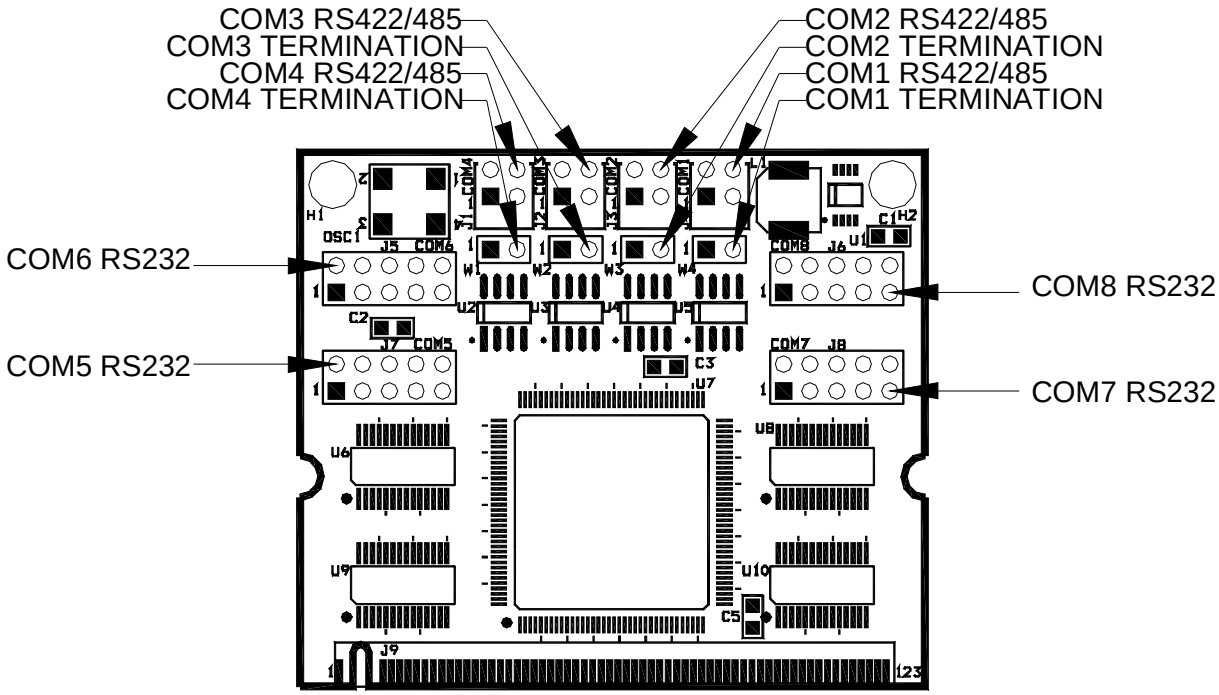
Octal Serial Controller Register Map

2.2. Interface Connectors

The GW2201 interface connector pin assignments and signal descriptions are included in the following sections. The connectors are listed in the table below and the connector locations are shown in the following assembly drawing.

Connector	Function
J1	COM4 RS422/485 Serial Port
J2	COM3 RS422/485 Serial Port
J3	COM2 RS422/485 Serial Port
J4	COM1 RS422/485 Serial Port
J5	COM6 RS232 Serial Port
J6	COM8 RS232 Serial Port
J7	COM5 RS232 Serial Port
J8	COM7 RS232 Serial Port
J9	Mini-PCI Connector

Interface Connectors



Component Locations

COM1 Through COM4 RS422/485 Serial Ports

The COM1 through COM4 serial ports are available through individual 2-pin screw terminals. The screw terminal is a Phoenix Contact 1725656, or equivalent. The connector supports a 20-30AWG wire with a 0.2-inch strip length.

Pin	Signal	Pin	Signal
1	Data+	2	Data-

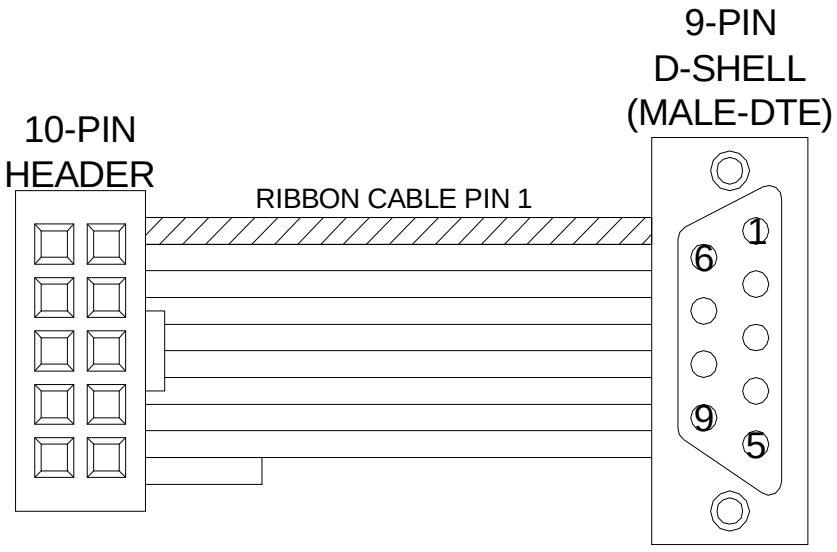
COM1 Though COM4 Serial Port Headers

COM5 Through COM8 RS232 Serial Ports

The COM5 through COM8 serial ports are available through a 10-pin header in a 2x5 configuration with 0.1-inch pin spacing. The pin assignment supports a ribbon cable connection to a standard 9-pin D-shell connector as shown in the following illustration.

Pin	Signal	Pin	Signal
1	Data Carrier Detect	2	Data Set Ready
3	Receive Data	4	Request To Send
5	Transmit Data	6	Clear To Send
7	Data Terminal Ready	8	Ring Indicator
9	Ground	10	No Connect

COM5 Though COM8 Serial Port Headers



PC Standard 9-Pin D-Shell Ribbon Cable

Mini-PCI Interface Connector

The Mini-PCI connector includes the 32-bit PCI interface signals shown below.

Pin	Signal	Connect	Pin	Signal	Connect	Pin	Signal	Connect
1	TIP	N/C	44	AD26	AD26	87	AD7	AD7
2	RING	N/C	45	CBE3#	CBE3#	88	VCC3	3.3V
3	LANRXP	N/C	46	AD24	AD24	89	VCC3	3.3V
4	LANTXP	N/C	47	AD23	AD23	90	AD6	AD6
5	LANRXN	N/C	48	IDSEL	IDSEL	91	AD5	AD5
6	LANTXN	N/C	49	Ground	Ground	92	AD4	AD4
7	LANRSV	N/C	50	Ground	Ground	93	Reserved	N/C
8	LANRSV	N/C	51	AD21	AD21	94	AD2	AD2
9	LANRSV	N/C	52	AD22	AD22	95	AD3	AD3
10	LANRSV	N/C	53	AD19	AD19	96	AD0	AD0
11	LANGNP	N/C	54	AD20	AD20	97	VCC5	N/C
12	LANRNN	N/C	55	Ground	Ground	98	Reserved	N/C
13	LANYEP	N/C	56	PAR	PAR	99	AD1	AD1
14	LANYEN	N/C	57	AD17	AD17	100	Reserved	N/C
15	CHSGND	N/C	58	AD18	AD18	101	Ground	Ground
16	Reserved	N/C	59	CBE2#	CBE2#	102	Ground	Ground
17	INTB#	N/C	60	AD16	AD16	103	ACSYNC	N/C
18	VCC5	N/C	61	IRDY#	IRDY#	104	M66EN	N/C
19	VCC3	3.3V	62	Ground	Ground	105	ACDIN	N/C
20	INTA#	INTA#	63	3.3V	VCC3	106	ACDOUT	N/C
21	Reserved	N/C	64	FRAME#	FRAME#	107	ACCLK	N/C
22	Reserved	N/C	65	CLKRUN#	Pull Down	108	ACID0	N/C
23	Ground	Ground	66	TRDY#	TRDY#	109	ACID1	N/C
24	VCC3AX	3.3V	67	SERR#	SERR#	110	ACRST	N/C
25	CLK	CLK	68	STOP#	STOP#	111	AMON	N/C
26	RST#	RST#	69	Ground	Ground	112	Reserved	N/C
27	Ground	Ground	70	VCC3	3.3V	113	AGND	N/C
28	VCC3	3.3V	71	PERR#	PERR#	114	Ground	Ground
29	REQ#	REQ#	72	DEVSEL#	DEVSEL#	115	AOUT	N/C
30	GNT#	GNT#	73	CBE1#	CBE1#	116	AIN	N/C
31	VCC3	3.3V	74	Ground	Ground	117	AGND	N/C
32	Ground	Ground	75	AD14	AD14	118	AINGND	N/C
33	AD31	AD31	76	AD15	AD15	119	AGND	N/C
34	PME#	N/C	77	Ground	Ground	120	AGND	N/C
35	AD29	AD29	78	AD13	AD13	121	Reserved	N/C
36	Reserved	N/C	79	AD12	AD12	122	MPCIACT	N/C
37	Ground	Ground	80	AD11	AD11	123	VCC5AX	N/C
38	AD30	AD30	81	AD10	AD10	124	VCC3AX	3.3V
39	AD27	AD27	82	Ground	Ground	125	CHSGND	N/C
40	VCC3	3.3V	83	Ground	Ground	126	CHSGND	N/C
41	AD25	AD25	84	AD9	AD9	127	N/C	N/C
42	AD28	AD28	85	AD8	AD8	128	N/C	N/C
43	Reserved	N/C	86	CBE0#	CBE0#			

Mini-PCI Connector

2.3. Manufactures Website Links / Support Mailing List

The section provides links to hardware and software related web sites.

Octal Serial Controller – Exar XR17D158
http://www.exar.com/product.php?ProdNumber=XR17D158&areaID=3

RS422/485 Serial Transceiver – Analog Devices ADM3485
http://analog.com/en/prod/0,2877,ADM3485E,00.html

RS232 Serial Transceiver – Analog Devices ADM211
http://www.analog.com/en/prod/0%2C2877%2CADM211E%2C00.html

3. SPECIFICATIONS

3.1. Electrical

Parameter Operating Voltage	**Specification**	
	Min	**Max**
Input Voltage	3.0VDC	3.6VDC

Parameter Operating Current	**Specification**	
	Typ	**Max**
Input Current	0.1A	

3.2. Mechanical

Parameter	**Specification**
Dimensions, Length x Width	2.35in x 2.00in (59.6mm x 50.95mm)
Dimensions, Height	0.33in (8.5mm)
Weight	0.7 ounces

3.3. Environmental

Parameter	**Specification**
Operating Temperature	0 to 70 °C
Storage Temperature	-40 to +85 °C
Non-condensing Relative Humidity	Less than 95% at 40 °C

4. CUSTOMER SUPPORT

4.1. Manual Revision History

Revision 00 - Initial release

4.2. Technical Assistance

Gateworks technical support staff is available to assist you with questions that you may have. Please contact Gateworks using one of the methods shown below.

Phone: (805) 461-4000
Fax: (805) 461-4001
Email: support@gateworks.com
Website: http://www.gateworks.com

4.3. Warranty

Standard hardware warranty period is ONE year from date of purchase. Gateworks will, solely at its option, repair or replace products, which prove to be defective in materials or workmanship, provided they are returned to a Gateworks authorized repair center. Shipment to Gateworks is at the customer's expense. Gateworks pays return shipment by ground.

Products, which in Gateworks opinion, have been subject to misuse, abuse, neglect or unauthorized alteration or repair are excluded from this warranty.

Products not manufactured by Gateworks are limited to the warranty provided by the original manufacturer and should be returned to the manufacturer in case of defect. Software is licensed AS IS. If for any reason, you are dissatisfied with the software return to Gateworks within 90 days for a full refund.

The liability of Gateworks under this agreement is limited to a refund of the purchase price of the product. In no event shall Gateworks be liable for loss of profits or other damage.

4.4. Return for Repair

You must obtain a Returned Material Authorization (RMA) number before sending any product to Gateworks. Please contact Gateworks using one of the methods shown below to obtain an RMA number. Please be ready with your name, telephone number, company name, company address, shipping address, invoicing address, product number, and a technical description of the problem. A service charge will be applied to units that are out of warranty. Please pack the unit being returned in anti-static material and ship in a sturdy cardboard box with adequate packing material. Mark the RMA number clearly on the outside of the box before returning.

Phone: (805) 461-4000
Fax: (805) 461-4001
Email: support@gateworks.com
Website: http://www.gateworks.com
Address: 7631 Morro Road, Atascadero, CA 93422

4.5. Life Support Policy

Gateworks products are not authorized for use as critical components in life support devices or systems without the express written approval of the president of Gateworks Corporation. Refer to the following for definitions of critical components and life support devices.

1. A critical component is any component of a life support device or system whose failure to perform can be expected to cause the failure of the life support device or system, affect its safety, or limit its effectiveness.

2. Life support devices or systems are devices or systems which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.

4.6. Trademarks

- All brand names or product names mentioned are trademarks or registered trademarks of their respective owners.

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