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232M300CE-CNT
232M300CT-CNT
Counter Module

Table of Contents

Introduction

This modules using RS-232 communications to access the counter data. The module has 16 digital counters made available through a DB 25 connector

I/O Module features:

MPU:	Microchip PIC18F442
EEPROM:	Microchip internal to MPU
MPU Clock:	10 Mhz
Interface:	RS-232 (single ended)
Baud:	9600, 19200, 57600, 115200 (DIP switch selectable)
LED:	Bicolor diagnostic LED
Watchdog:	MPU has built-in watchdog timer
POR:	MPU contains timed Power On Reset circuitry
Brownout:	MPU brownout detection ciruictry built-in
Temperature:	0° to 70°C (32° to 158°F) *Commercial Temperature Range*
PCB:	FR4
Power:	7.5Vdc to 15.0 Vdc (approx. 50 ma nominal power)
Counters	16 digital counters 20KHZ count rate

Quick Start Instructions

You need the following:

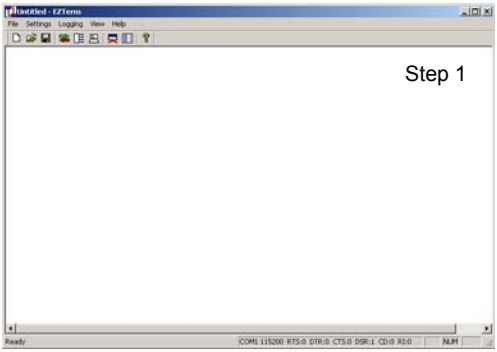
- EZTerminal program available **free** on our website http://**www.integrityusa.com**
- An open COMPORT on your PC
- Power supply PS9J (9VDC 400 ma unregulated)
- A cable to connect your PC (C9F9M-6 6 foot serial cable)

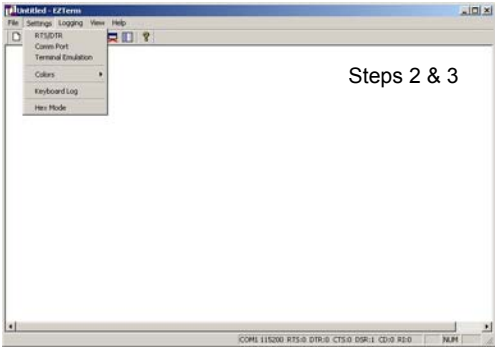
Make these DIP switch settings for 115,200 baud

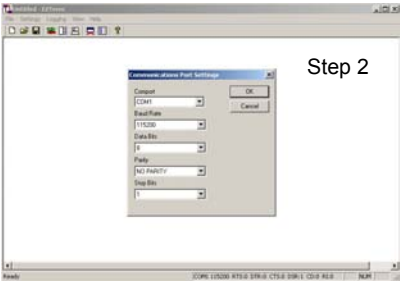
SW1: ON
SW2: ON (These are **factory default** settings, see page 7)

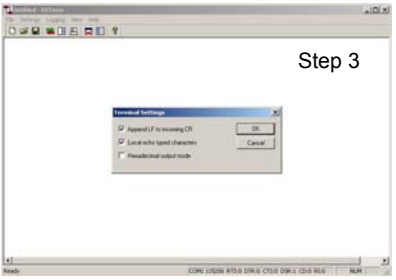
Launch the EZTerminal program

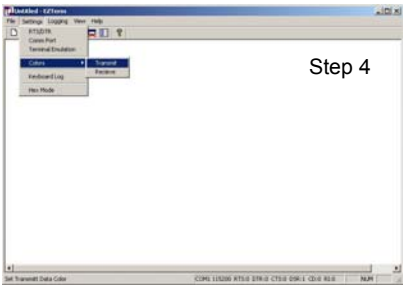
1. Double click the icon in whatever area you have put the program.
2. Under "**Settings**" then choose Comport and select your RS-232 port, 115,200 Baud Rate, 8 Data Bits, NO PARITY, and 1 Stop Bits.
3. Under "**Settings**" now choose "**Terminal Settings**", and check the "**Append LF to incoming CR**" box, and "**Local echo typed characters**" check box.
4. You may change the color of the transmitted and received characters by going under "**Settings**" and selecting "**Colors**" then "**Transmit**" or "**Receive**" and pick the color of your choice.

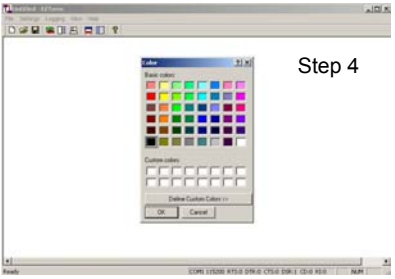












Your First Command

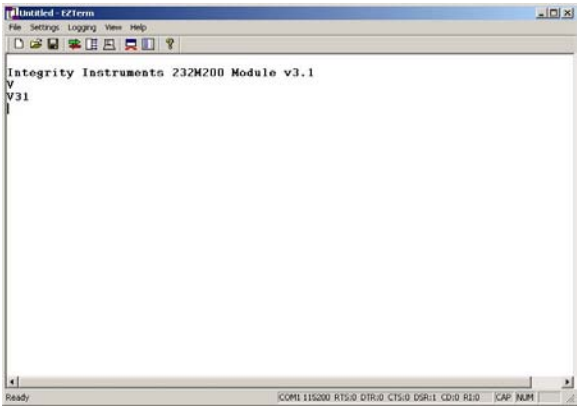
Now that you have a EZTerminal session running, your ready to power up the **232M300-CNT** Module. After powering up your **232M300-CNT** Module, EZTerminal will receive a welcome message from the unit indicating you are ready to provide your first command.

RS-232 Firmware Version Command:

- Typethe letter **V** and the **Enter Key**
- You should see version number Vxxx on the screen
- **NOTE:** Make sure to type **CAPITAL V**, not lowercase v!

After your first command, see **Commands and Responses** section for more commands.

Screenshots and setup instructions performed running EZTerminal on a PC installed with Microsoft® Windows® XP Operating System.



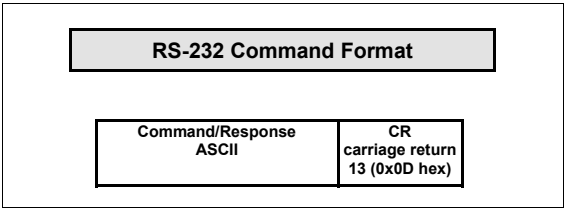
Communications

The Integrity Instruments **232M300-CNT** I/O Modules support RS-232 communications interface using simple **ASCII** commands. A carriage return **(decimal code 13 or Hex code 0x0D)** marks the end of each command. Line feeds **(decimal code 10 or Hex code 0x0A)** are ignored.

RS-232 Command Format

NOTE

- All numeric data is represent as **ASCII Hexadecimal integers** (values **x/y** in the Command and Response table)
- If a module receives an illegal or improperly formatted command, Error Response is sent.
- All ASCII characters are **CASE SENSITIVE** (use all capital letters!)



Commands and Responses Format

Command Sent by Host	**Response** Sent by I/O Module	**Description**
V	Vxy	Firmware version x.y
Ny	Nyxxxxxxxx	Get Pulse Counter y is hex value 0 to F Ny(xxxxxxxx 32 bit counter value)
My	M	Clear Pulse Countery y is hex value 0 to F
MX	MX	Clears all counters
Z	Z	Reset CPU
	X	**Command error response**

Digital I/O	
DB25 Pins	**Description**
1	N0_COUNTER
2	N1_COUNTER
3	N2_COUNTER
4	N3_COUNTER
5	N4_COUNTER
6	N5_COUNTER
7	N6_COUNTER
8	N7_COUNTER
9	N/A
10	N/A
11	+V Unreg
12	+5Vdc
13	GND
14	N8_COUNTER
15	N9_COUNTER
16	NA_COUNTER
17	NB_COUNTER
18	NC_COUNTER
19	ND_COUNTER
20	NE_COUNTER
21	NF_COUNTER
22	N/A
23	N/A
24	+5Vdc
25	GND

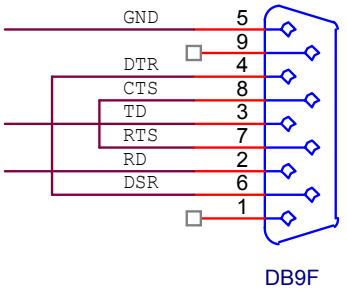
Commands and Responses
The following table illustrates actual command and response data for an RS-232 interface.

NOTE:

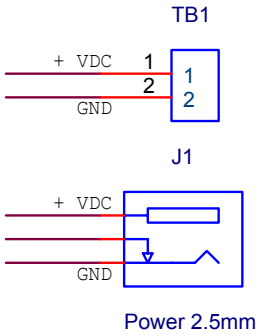
- All numeric data is represent as ASCII Hexadecimal integers.
- The symbol ↵ equates to a carriage return (decimal 13, hex 0x0D).

Command Sent by Host	**Response** Sent by I/O	**Description**
V↵	V30↵	Module Firmware version 3.0
N**x**↵	N**x**0000000F↵	Get pulse counter: **x** is counter number Count value =15
M**x**↵	M**x**↵	Clear pusle counter: **x** is counter number Current count = 0
Z↵	Z↵	Reset CPU (forces a watchdog timeout)

COMMUNICATION PORT ON BOARD WIRING



POWER CONNECTIONS ON BOARD WIRING



Baud Rate Switch Settings		
SW1	**SW2**	**Baud Rate**
OFF	OFF	9600 baud
ON	OFF	19200 baud
OFF	ON	57600 baud
ON	ON	115200 baud **(factory default)**

Digital I/O Port Pin outs
And Hex Conversion Chart

Digital I/O	
DB25 Pins	**Description**
1	Port 2 Bit 0
2	Port 2 Bit 1
3	Port 2 Bit 2
4	Port 2 Bit 3
5	Port 2 Bit 4
6	Port 2 Bit 5
7	Port 2 Bit 6
8	Port 2 Bit 7
9	N/A
10	N/A
11	+V Unreg
12	+5Vdc
13	GND
14	Port 1 Bit 0
15	Port 1 Bit 1
16	Port 1 Bit 2
17	Port 1 Bit 3
18	Port 1 Bit 4
19	Port 1 Bit 5
20	Port 1 Bit 6
21	Port 1 Bit 7
22	N/A
23	N/A
24	+5Vdc
25	GND

EXAMPLE HEX CONVERSION																
	X				X				Y				Y			
BITS	1	1	0	0	1	0	0	0	1	0	1	1	0	1	1	1
HEX	C				8				B				7			

PORT 1									PORT 2							
X					X				Y				Y			
HEX VALUE	BIT VALUE				HEX VALUE	BIT VALUE			HEX VALUE	BIT VALUE			HEX VALUE	BIT VALUE		
	7	6	5	4		3	2	1	0		7	6	5	4		3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	1
2	0	0	1	0	2	0	0	1	0	2	0	0	1	0	2	0	0	1	0
3	0	0	1	1	3	0	0	1	1	3	0	0	1	1	3	0	0	1	1
4	0	1	0	0	4	0	1	0	0	4	0	1	0	0	4	0	1	0	0
5	0	1	0	1	5	0	1	0	1	5	0	1	0	1	5	0	1	0	1
6	0	1	1	0	6	0	1	1	0	6	0	1	1	0	6	0	1	1	0
7	0	1	1	1	7	0	1	1	1	7	0	1	1	1	7	0	1	1	1
8	1	0	0	0	8	1	0	0	0	8	1	0	0	0	8	1	0	0	0
9	1	0	0	1	9	1	0	0	1	9	1	0	0	1	9	1	0	0	1
A	1	0	1	0	A	1	0	1	0	A	1	0	1	0	A	1	0	1	0
B	1	0	1	1	B	1	0	1	1	B	1	0	1	1	B	1	0	1	1
C	1	1	0	0	C	1	1	0	0	C	1	1	0	0	C	1	1	0	0
D	1	1	0	1	D	1	1	0	1	D	1	1	0	1	D	1	1	0	1
E	1	1	1	0	E	1	1	1	0	E	1	1	1	0	E	1	1	1	0
F	1	1	1	1	F	1	1	1	1	F	1	1	1	1	F	1	1	1	1

WARRANTY
Integrity Instruments warranties **all** products against defective workmanship and components for the life of the unit. Integrity Instruments agrees to repair or replace, at it's sole discretion, a defective product if returned to Integrity Instruments with proof of purchase. Products that have been mis-used, improperly applied, or subject to adverse operating conditions fall beyond the realm of defective workmanship and are not convered by this warranty.