SENDING COMMANDS FOR POWER ANALYZER 2 STEP BY STEP USING ARDUINO

1. Upload the this code.

```
1 void setup() {
2  // put your setup code here, to run once:
3
4 }
5
6 void loop() {
7  // put your main code here, to run repeatedly:
8
9 }
```

2.Construct the wiring Diagram using Arduino UNO as UART.



3. Open Terminal 1.9b. Rescan and choose the right comport (make sure the arduino is connected to PC via USB). Set the baudrate, data bits, patiry, sto bits, handshaking.

arminal v1.9b - 20130116B - by Br@y++

| Connect | COM Port | Baud rate | | | Data bits | Paritu | _Stop bits_ | Handsbaking | |
|---------------|----------|-------------------------------|---------|----------|-----------|----------|-------------|----------------------|---|
| BeScan | | C 600 | C 14400 | C 57600 | 0.5 | • none | | 💿 none | |
| Help | | O 1200 | C 19200 | O 115200 | 0.6 | 000 | | C TTS/CTS | |
| | COM | 2400 | C 28800 | 128000 | 07 | 🔘 even 🛛 | O 1.5 | C XON/XOFF | |
| <u>A</u> bout | LOWS | C 4000 | C 38400 | C 256000 | | 🔿 mark 📗 | | C RTS/CTS+XON/XOFF | |
| <u>Q</u> uit | | 9600 | C 56000 | ○ custom | • 8 | C space | 0.2 | ◯ RTS on TX 🔲 invert | |
| Settings | | | | | _ | | | | _ |

4 After you set the terminal. Click Connect.

🧸 Terminal v1.9b - 20130116ß - by Br@y++

There should be a display like on the picture below. (Readable Formart - M1)

| Connect COM Port Baud rate Data bits Parity Stop bits Handshaking BeScan COM10 C1200 19200 C115200 C 6 C 0dd C 1 Conne C None C 1 Conne C None C 1 C None C None C 1 C None C | | | | | | | |
|---|--|--|--|--|--|--|--|
| Settings | | | | | | | |
| Receive CLEAR ▼ AutoScroll Reset Cnt 13 ◆ Cnt = 917 C HEX CLEAR ▼ AutoScroll Reset Cnt 13 ◆ Cnt = 917 C ACCU StartLog StopLog Req/Resp ■ Dec ■ Bin Hex | | | | | | | |
| VA: 2.11 Q Power: 0.38 Q Instant: 2.83 PF: -0.0786 Temperature: 26.61 Harmonic: -0.02 Fundamental: -0.15 Fundamental Reactive: 0.38 Watt-Hour: 0.010 Integration Time: 0:03:04 Volt RMS: 231.93 Amp RMS: 0.01 Real Power: -0.16 VA: 2.11 Q Power: 0.40 Q Instant: -2.17 PF: -0.0772 Temperature: 26.45 Harmonic: -0.02 Fundamental: -0.15 Fundamental Reactive: 0.40 Watt-Hour: 0.010 Integration Time: 0:03:05 Volt RMS: 231.92 Amp RMS: 0.01 Real Power: -0.20 VA: 2.11 Q Power: 0.44 Q Instant: 0.64 | | | | | | | |
| PF: -0.0967 Temperature: 26.52 Harmonic: -0.01 Fundamental: -0.19 Fundamental Reactive: 0.43 | | | | | | | |
| Transmit CLEAR Send File 1 | | | | | | | |
| Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 | | | | | | | |
| \$02M2\$03 | | | | | | | |

To Change it to $M2-ASCII\ CSV$ formar.

5. Type the \$02M2\$03.

| Macros | | | | | |
|------------|------------|---------|-------------|-------------|---------|
| Set Macros | AT M2 | M3 M4 | M5 M6 M7 | M8 M9 M10 | M11 M12 |
| | M13 M14 | M15 M16 | M17 M18 M19 | M20 M21 M22 | M23 M24 |
| | | | | | |
| \$02M2\$03 | | | | | |
| M20 | | | | | |
| M10 | | | | | |
| | | | | | |
| | D.,, 2004E | T 0 | | | |

6. The display should be like this after you send the Command.

| COMPact BeScan COM Port COM7 Bad rate 600 14400 5500 Compact 5 Stop bis Headwing Compact For and Compact For anothe Compact For anothe Compact | 🧸 Terminal v1.9b - 20130116B - by Br@y++ | - | | | | | |
|--|--|-------------|------------------|--|--|--|--|
| Setting: Auto Dis/Connect [Time] Stream log cutom BR RX Clear ASCII table Scipting CT S [Graph Remote Receive CLEAR CAtdoStat Script] CR=LF [Stay on Top 9500 1 2 Graph Remote Dec [Bin] V1: 2.16 Q Power: 0.34 Q Instant: 2.39 PF -0.0951 Temperature: 21.39 HEX Dec [Bin] Hearmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: 0.01 Watt-Hour: 0.001 Interperature: 21.44 V0: 1.20 C Temperature: 21.44 Hamonic: -0.21 Fundamental: 0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:00:14 Voit RMS: 232.13 Amp RMS: 0.01 Real Power: -0.20 VX: 2.11 Q Power: 0.33 Q Instant: 0.24 V7: -0.060 Temperature: 21.44 Hamonic: -0.21 Fundamental: 0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:00:15 OK,1102,232.48,0.009,-0.20,2.11,0.35,0.65,-0.0956,21.44,-0.21,0.01,-0.01,0.001,161 OK,1102,232.11,0.009,-0.22,2.16,0.33,-0.75,-0.100,1,21.42,-0.24,-0.01,-0.24,2.11,0.35,0.44,-0.24,-0.01,-0.24,2.11,0.35,0.44,-0.01,-0.01,0.001,101 OK,1102,232.21,0.009,-0.24,2.11,0.35,0.44,-0.01,-0.110,0.21.41,-0.24,0.01,0.01,0.01,0.01,0.01,0.01,0.01,0.0 | Commerce: COM Port Baud rate Data bits Parity Stop bits Handshaking BeScan COM7 ▼ C 600 C 14400 C 57600 C 5 C none C 1 C none C RTS/CTS Help C 2400 C 28800 C 128000 C 26800 C 26000 C 7 C mark C 1.5 C X0N/X0FF Quit 9600 C 56000 C sustom 8 C space C 2 C RTS/CTS+X0N/X0FF | | | | | | |
| Settor: AudoStartScript CR=LF Stay on Top Settor: AudoStartScript CR=CR Stay on Top Settor: | | _ | | | | | |
| Receive CLEAR Image: AutoScroll Reset Cnt T3 Cnt = 959 HEX ASCII StartLog StopLog Dec Bin Hex VA: 2.16 Q Power: 0.34 Q Instant: 2.39 F: -0.0551 Temperature: 21.25 Harmonic: -0.31 Fundamental 0.01 Fundamental Reactive: 0.01 Watt-Hour: 0.001 Integration Time: 0:001:44 Voit RMS: 232.13 Amp RMS: 0.01 Real Power: -0.20 VX: 2.11 Q Power: 0.33 Q Instant: 0.24 PF: -0.0560 Temperature: 21.44 Harmonic: -0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:001:15 OK, 1102, 232.49, 0.009, -0.20, 2.11, 0.35, 0.85, -0.0958, 21.44, -0.21, 0.01, -0.01, 0.001, 16! OK, 1102, 232.11, 0.009, -0.22, 2.16, 0.33, -0.75, -0.10; 1, 21.57, -0.33, 0.01, -0.01, 0.001, 21! OK, 1102, 232.14; 0.009, -0.22, 2.16, 0.33, -0.75, -0.10; 1, 21.57, -0.33, 0.01, 2.0! OK, 1102, 231.48, 0.009, -0.19, 2.16, 0.42, 0.73, -0.0083, 21.46, -0.01, -0.18, 0.35, 0.01, 2.0! Output: Demondential Reactive: -0.01 Vater Integration Time: 0:000, 20.01, 20! OK, 1102, 231.42, -0.02, 0.01, 0.01, 0.00, 1.10; 1, 21.57, -0.010, 0.01, 20! OK, 1102, 231.42, -0.02, 0.01, 0.00, 21.45, -0.22, 0.01, 0.01, 0.00, 1.19! OK, 1102, 232.21, 0.009, -0.24, 2.11, 0.35, 0.01, 2.0! Tenemint Image: Integration Time: | Set font Auto Dis/Lonnect I Imme Stream log Custom Brink Liear ASLII table Scripting AutoStart Script CR=LF Stay on Top 9600 1 1 Craph Remote | | DSR [| | | | |
| CLEAR M AudoScroll Reset Crt 13 Crt = 959 Crt HEX ASCII StartLog StopLog Req/Resp Dec Bin VA: 2.16 Q Power: 0.34 Q Instant: 2.39 PF: -0.0951 Temperature: 21.29 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: 0.01 Hatt-Hour: 0.001 Integration Time: 0:00:14 Volt Start 2.39 VA: 2.11 Q Power: 0.33 Q Instant: 0.24 PF: -0.0960 Temperature: 21.44 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:00:15 OK, 1102, 232.49, 0.009, -0.20, 2.11, 0.35, 0.65, -0.0956, 21.44, -0.21, 0.01, -0.01, 0.001, 160 OK, 1102, 232.11, 0.009, -0.22, 2.16, 0.33, -0.75, -0.101, 21.57, -0.23, 0.01, -0.01, 70.001, 100, 0.01, 160 OK, 1102, 232.11, 0.009, -0.22, 2.16, 0.33, -0.75, -0.101, 21.57, -0.23, 0.01, -0.01, 0.000, 171 OK, 1102, 231.67, 0.005, -0.23, 2.06, 0.34, 0.17, -0.1100, 21.41, -0.23, 0.01, 0.01, 0.001, 100 OK, 1102, 231.20, 0.09, -0.15, 2.16, 0.42, 0.73, -0.0983, 21.46, -0.01, -0.18, 0.35, 0.001, 201 OK, 1102, 231.42, -0.24, -0.00, -1 Transmit CLEAR Send File CR DTR Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 Watcos M13 M14 M15 M16 M7 M8 M9 M10 M11 M12 Macros AT M2 M3 M4 M5 M6 M7 M | Receive | | | | | | |
| VA: 2.16 Q Power: 0.34 Q Instant: 2.39 PF: -0.0551 Temperature: 21.25 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: 0.01 Watt-Hour: 0.001 Integration Time: 0:00:14 Volt RMS: 232.13 Amp RMS: 0.01 Real Power: -0.20 VA: 2.11 Q Power: 0.33 Q Instant: 0.24 PF: -0.0560 Temperature: 21.44 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:00:15 OK, 1102, 232.48, 0.005, -0.20, 2.11, 0.35, 0.85, -0.0568, 21.44, -0.21, 0.01, -0.01, 0.001, 160 K, 1102, 232.11, 0.005, -0.22, 2.16, 0.33, -0.75, -0.101, 21.57, -0.23, 0.01, -0.01, 0.001, 170 K, 1102, 231.67, 0.005, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.120, 0.10, 0.001, 170 K, 1102, 231.67, 0.005, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.012, -0.24, -0.01, 0.001, 180 K, 1102, 232.12, 0.005, -0.22, 2.16, 0.33, -0.75, -0.101, 21.57, -0.23, 0.01, 0.01, 200 K, 1102, 231.67, -0.005, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, 2.11, 0.35, -3.46, -0.1120, 21.42, -0.24, -0.00, -0.24, -0.21, 0.24, -0.24, -0.00, -0.24, -0.21, 0.21, 0.21, 0.24, -0.02, -0.00, -0.24, 2.21, 0.35, 0.36, -0.01, -0.18, 0.35, 0.001, 210 Transmit CLEAR SendFile 1 CR=CR+LF BREAK Macros Set Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 \$Q2M2\$Q3 +CR | CLEAR AutoScroll Reset Cnt 13 Cnt = 959 ASCII StartLog StopLog Req/Resp Hex | | | | | | |
| Volt RMS: 232.13 Amp RMS: 0.01 Real Power: -0.20 VA: 2.11 Q Power: 0.33 Q Instant: 0.24 PF: -0.0960 Temperature: 21.44 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:00:15 OK,1102,232.48,0.009,-0.20,2.11,0.35,0.85,-0.0958,21.44,-0.21,0.01,-0.01,0.001,160 K,1102,232.11,0.009,-0.22,2.16,0.33,-0.75,-0.101,21.57,-0.23,0.01,-0.01,0.001,170 K,1102,231.87,0.009,-0.23,2.06,0.34,0.17,-0.1100,21.41,-0.23,0.01,0.01,0.001,180 K,1102,232.21,0.009,-0.24,2.11,0.35,-0.35,-0.100,21.45,-0.22,0.01,0.01,0.001,190 K,1102,232.16,0.009,-0.24,2.11,0.35,3.46,-0.1120,21.42,-0.24,-0.00,-0.24,0.01,0.01,200 OK,1102,231.82,0.009,-0.19,2.16,0.42,0.73,-0.0883,21.46,-0.01,-0.18,0.39,0.001,210 Transmit CLEAR Send File 1 CR=CR+LF BREAK Macros Set Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 \$02M2\$03 +CR < | VA: 2.16 Q Power: 0.34 Q Instant: 2.39 PF: -0.0551 Temperature: 21.29 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: 0.01 Watt-Hour: 0.001 Integration Time: 0:00:14 | | | | | | |
| OK, 1102, 232.48, 0.009, -0.20, 2.11, 0.35, 0.85, -0.0958, 21.44, -0.21, 0.01, -0.01, 0.001, 16ll OK, 1102, 232.11, 0.009, -0.22, 2.16, 0.33, -0.75, -0.101, 21.57, -0.23, 0.01, -0.01, 0.001, 17ll OK, 1102, 232.18, 0.009, -0.23, 2.06, 0.34, 0.17, -0.1100, 21.41, -0.23, 0.01, 0.001, 10ll OK, 1102, 232.21, 0.005, -0.23, 2.06, 0.34, 0.17, -0.1100, 21.41, -0.23, 0.01, 0.001, 10ll OK, 1102, 232.21, 0.005, -0.23, 2.06, 0.34, 0.17, -0.1100, 21.41, -0.23, 0.01, 0.001, 10ll OK, 1102, 232.21, 0.005, -0.24, 2.11, 0.35, 3.46, -0.1120, 21.42, -0.24, -0.00, -0.00, 200 OK, 1102, 231.82, 0.005, -0.15, 2.16, 0.42, 0.73, -0.0883, 21.46, -0.01, -0.18, 0.39, 0.001, 21l Transmit CLEAR Send File 1 CR=CR+LF BREAK DTR Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 \$02M2\$03 C42303 C42 C12 | Volt RMS: 232.13 Amp RMS: 0.01 Real Power: -0.20 VA: 2.11 Q Power: 0.33 Q Instant: 0.24 PF: -0.0960 Temperature: 21.44 Harmonic: -0.21 Fundamental: 0.01 Fundamental Reactive: -0.01 Watt-Hour: 0.001 Integration Time: 0:00:15 | | | | | | |
| Transmit CLEAR Send File 1 CR=CR+LF BREAK DTR Macros Set Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 Matros M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 \$02M2\$03 T +CR +CR | OK,1102,232.48,0.009,-0.20,2.11,0.35,0.85,-0.0958,21.44,-0.21,0.01,-0.01,0.001,1€Ů OK,1102,232.11,0.009,-0.22,2.16,0.33,-0.75,-0 0.23,0.01,-0.01,0.001,17Ѷ OK,1102,231.87,0.009,-0.23,2.06,0.34,0.17,-0.1100,21.41,-0.23,0.01,0.01,0.001,18Ѷ OK,1102,232.21,0.009,- 0.21,2.11,0.33,-0.39,-0.1000,21.45,-0.22,0.01,0.01,0.001,19Ѷ OK,1102,232.16,0.009,-0.24,2.11,0.35,3.46,-0.1120,21.42,-0.24,-0.00, 0.00,0.001,20Ѷ OK,1102,231.82,0.009,-0.19,2.16,0.42,0.73,-0.0883,21.46,-0.01,-0.18,0.39,0.001,21♡ | .101,2 - | 21.57 , - | | | | |
| Macros Set Macros M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 \$02M2\$03 ↓+CR → | Transmit CLEAR Send File 1 	✿ □ CR=CR+LF BREAK | |]DTR [| | | | |
| \$02M2\$03 | Macros Set Macros AT M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 | | | | | | |
| | \$02M2\$03 | - +0 |)R _→ | | | | |

DONE