MAGTROL

Model 3411

Torque Display

User's Manual

Purchase Record

Please record all model numbers and serial numbers of your Magtrol equipment, along with the general purchase information. The model number and serial number can be found on either a silver identification plate or white label affixed to each unit. Refer to these numbers whenever you communicate with a Magtrol representative about this equipment.

Model Number: _____

Serial Number: _____

Purchase Date: _____

Purchased From: _____

Second Edition - rev B – February 2021

MAGTROL

Safety Precautions

1. To ensure personal safety and proper operation, make sure that all Magtrol Torque Transducers and electronic products are earth grounded.
2. Make sure that all torque transducers and motors under test are equipped with appropriate safety guards.

Revisions To This Manual

The contents of this manual are subject to change without prior notice. Should revisions be necessary, updates to all Magtrol User's Manuals can be found at Magtrol's web site at www.magtrol.com/support/manuals.htm.

Please compare the date of this manual with the revision date on the web site, then refer to the manual's Table of Revisions for any changes/updates that have been made since this edition.

REVISION DATE

Second Edition - rev B – February 2021

TABLE OF REVISIONS

Date	Edition	Change	Section(s)
02/02/21	2nd. Edition - rev B	About the USB Interface updated.	5.1
08/08/17	2nd. Edition - rev A	Filter cutoff frequencies updated.	8.1
05/13/15	2nd. Edition	Appendix C - Computer controlled operation prior to version X added.	Appendix C
05/13/15	2nd. Edition	Digital filter equations updated.	8.1
05/13/15	2nd. Edition	Chapter 6 - Mag.NET commands added.	Chapter 6
05/13/15	2nd. Edition	Computer controlled operation instructions updated.	Chapter 5
05/13/15	2nd. Edition	Manually controlled operation instructions updated.	Chapter 4
05/13/15	2nd. Edition	Main Menu changed to Default Display.	3.1.3
05/13/15	2nd. Edition	Button function descriptions updated.	2.1
09/12/14	1st. Edition - rev C	LAN Setup Commands updated.	5.3.3
07/28/14	1st. Edition - rev B	Chapter 7 - Theory added to manual.	Chapter 7
03/10/14	1st. Edition - rev A	3411 Block Diagram updated.	A.1

Table of Contents

TABLE OF FIGURES

Preface

PURPOSE OF THIS MANUAL

This manual contains all the information required for the installation and general use of the Model 3411 Torque Display. Please read this manual in its entirety before operating. Keep the manual in a safe place for quick reference whenever a question should arise.

WHO SHOULD USE THIS MANUAL

This manual is intended for bench test operators who are going to use the 3411 Torque Display in conjunction with any Magtrol TM In-Line Torque Transducer or TF Torque Flange Sensor.

MANUAL ORGANIZATION

This section gives an overview of the structure of the manual and the information contained within it. Some information has been deliberately repeated in different sections of the document to minimize cross-referencing and to facilitate understanding through reiteration.

The structure of the manual is as follows:

Chapter 1: INTRODUCTION - Gives a general overview of the 3411 Torque Transducer Display. The mechanical and electrical characteristics of the unit are given here.

Chapter 2: CONTROLS - Description of the elements located on the front and rear panels of the unit.

Chapter 3: INSTALLATION/CONFIGURATION - Provides the information needed to setup the 3411.

Chapter 4: MANUALLY CONTROLLED OPERATION - Describes how to run a test using the 3411 as a stand-alone unit.

Chapter 5: COMPUTER CONTROLLED OPERATION - Describes how to run a test using the 3411 in conjunction with a personal computer. Includes information about the USB and Ethernet interfaces.

Chapter 6: Mag.NET COMMAND SET - Describes the commands used to control the 3411.

Chapter 7: CALIBRATION - Suggests a recommended calibration schedule and provides step-by-step instructions to calibrate the 3411.

Chapter 8: THEORY

Chapter 9: TROUBLESHOOTING - Solutions to common problems encountered during setup and testing.

Appendix A: SCHEMATICS - For the 3411 Display.

Appendix B: MENU SELECTION - Menu selection diagram.

Appendix C: COMPUTER CONTROLLED OPERATON - Firmware prior to version L.

CONVENTIONS USED IN THIS MANUAL

The following symbols and type styles may be used in this manual to highlight certain parts of the text:

Note: This is intended to draw the operator's attention to complementary information or advice relating to the subject being treated. It introduces information enabling the correct and optimal functioning of the product to be obtained.

CAUTION: THIS IS USED TO DRAW THE OPERATOR'S ATTENTION TO INFORMATION, DIRECTIVES, PROCEDURES, ETC. WHICH, IF IGNORED, MAY RESULT IN DAMAGE BEING CAUSED TO THE MATERIAL BEING USED. THE ASSOCIATED TEXT DESCRIBES THE NECESSARY PRECAUTIONS TO TAKE AND THE CONSEQUENCES THAT MAY ARISE IF THE PRECAUTIONS ARE IGNORED.

WARNING! THIS INTRODUCES DIRECTIVES, PROCEDURES, PRECAUTIONARY MEASURES, ETC. WHICH MUST BE EXECUTED OR FOLLOWED WITH THE UTMOST CARE AND ATTENTION, OTHERWISE THE PERSONAL SAFETY OF THE OPERATOR OR THIRD PARTY MAY BE PUT AT RISK. THE READER MUST ABSOLUTELY TAKE NOTE OF THE ACCOMPANYING TEXT, AND ACT UPON IT, BEFORE PROCEEDING FURTHER.

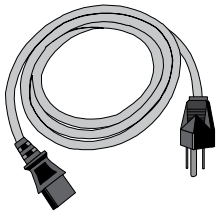
1. Introduction

1.1 UNPACKING YOUR 3411 TORQUE DISPLAY

Your 3411 Torque Display was packaged in reusable, shock resistant packing material that will protect the instrument during normal handling.

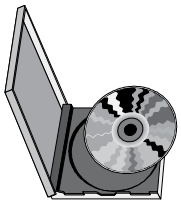
1. Make sure the carton contains the following:

3411 Torque Display

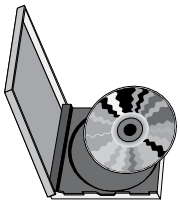


Line cord

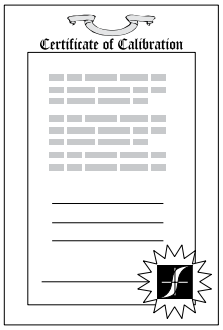
USB Cable



Magtrol
User Manual
CD-Rom



Torque 7 Data
Acquisition
Software



Calibration Certificate

2. Inspect the contents for any evidence of damage in shipping. In the event of shipping damage, immediately notify the carrier and Magtrol's Customer Service Department.

☞	Note:	Save all shipping cartons and packaging material for reuse when returning the instrument for calibration or servicing.

1.2 NEW FEATURES OF THE 3411 TORQUE DISPLAY

Magtrol's 3411 Torque Display is an upgraded version of the Magtrol 3410 Torque Display. Designed for use with Magtrol's TM In-Line Torque Transducers and TF Torque Flange Sensors, the new features of the 3411 include:

- Isolated USB Interface
- Ethernet connectivity
- Quadrature decoding – high resolution quadrature encoder enables low speed measurements
- User selected analog or digital speed output
- User interface improvements to button placement and menu navigation

1.3 DATA SHEET

MODEL 3411
TORQUE DISPLAY

FEATURES

- For use with all Magtrol TS / TM / TMHS / TMB In-Line Torque Transducers and TF Torque Flange Sensors
- High Quality, Easy-to-Read Vacuum Fluorescent Readout: Displays torque, speed and power
- Addition of high resolution quadrature encoder enables low RPM applications or position measurements
- Selectable English, Metric and SI Torque Units
- Isolated USB Interface
- Ethernet connectivity
- Torque: Analog, raw sensor output
- Speed output; analog or digital, user selectable
- B.I.T.E. (Built-In Test Equipment)
- Overload Indication
- TARE Function
- Includes Magtrol TORQUE Software
- High Speed Data Acquisition: Up to 500 torque and speed points per second with time stamp
- Rack mount or handle versions available

Fig. 1: MODEL 3411 | Torque Display

TORQUE SOFTWARE

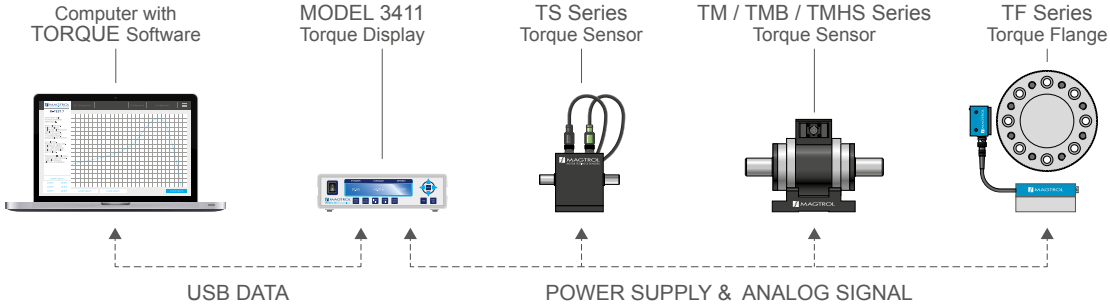
Magtrol's TORQUE Software is a user-friendly LabView™ executable program, used to automatically collect torque, speed and mechanical power data. The data can be printed, displayed graphically or quickly saved as a Microsoft® Excel spreadsheet. Standard features of TORQUE include:

- Measured Parameter vs. Time
- Adjustable Sampling Rates
- Polynomial Curve Fitting
- Peak Torque Capture
- Direction of Rotation
- Multi-Axes Graphing
- Optional USB Interface: for reading up to 4 thermocouples

DESCRIPTION

Magtrol's MODEL 3411 - Torque Display is designed for use with all Magtrol TS, TM, TMHS, TMB and TF Torque Transducers. This easy-to-use device powers the transducer and utilizes high speed processing to display torque, speed and mechanical power. It includes a tare function to help offset any slight residuals caused by couplings or suspended loads. The MODEL 3411 may also be used with any torque sensors requiring 24 V DC power (500 mA max.) with ± 5 V DC torque output (± 10 V DC max.) and open collector, TTL or CMOS output for the speed signal.

SYSTEM CONFIGURATIONS



GENERAL INFORMATION

SPECIFICATIONS

MEASUREMENT CHARACTERISTICS	
Maximum Input Speed	199 999 rpm
Maximum Input Frequency	199 999 Hz
Speed Accuracy	0.01 % of reading from 5 to 199 999 rpm
Torque Accuracy	0.02 % of range (± 10 V)

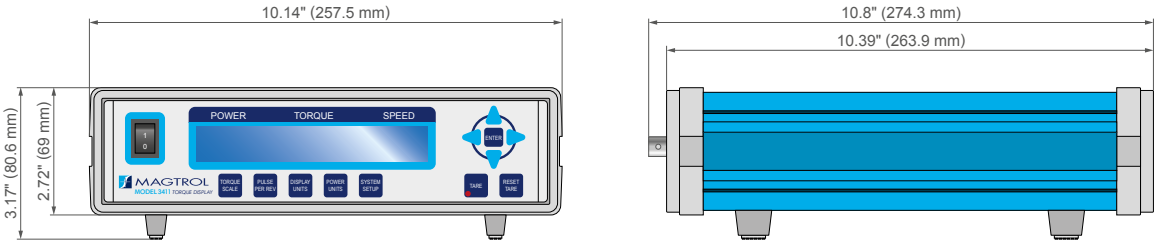
ELECTRICAL CHARACTERISTICS	
Voltage Requirements	120/240 V AC / 60/50 Hz [a]
Power Requirements	36 V A
Sensor Power Available (through the 14-pin Connector)	5 V DC 200 mA, fused internally at 500 mA 24 V DC 500 mA, short circuit protected
Fuses (5 x 20 mm)	IEC / 500 mA / 250 V AC / T

INPUTS AND OUTPUTS	
Transducer Input Speed / Angle	Open Collector, 5 V HC, TTL, CMOS
Transducer Input Torque	±10 V DC max
Torque Output BNC	±10 V DC (direct from transducer)
Speed Output BNC	5 V HC pulse (buffered from transducer) or ±10 V DC analog

ENVIRONMENT	
Operating Temperature	5 °C to 50 °C
Relative Humidity	< 80 %
Temperature Coefficient	0.001 % (5 °C to 50 °C) of FS / °C
Weight	5.11 lb (2.32 kg)

a) The MODEL 3411 has built-in Over Voltage protection on the AC power entry in order to comply to CE requirements. Do not perform insulation tests at a voltage higher than 250 V DC.

DIMENSIONS



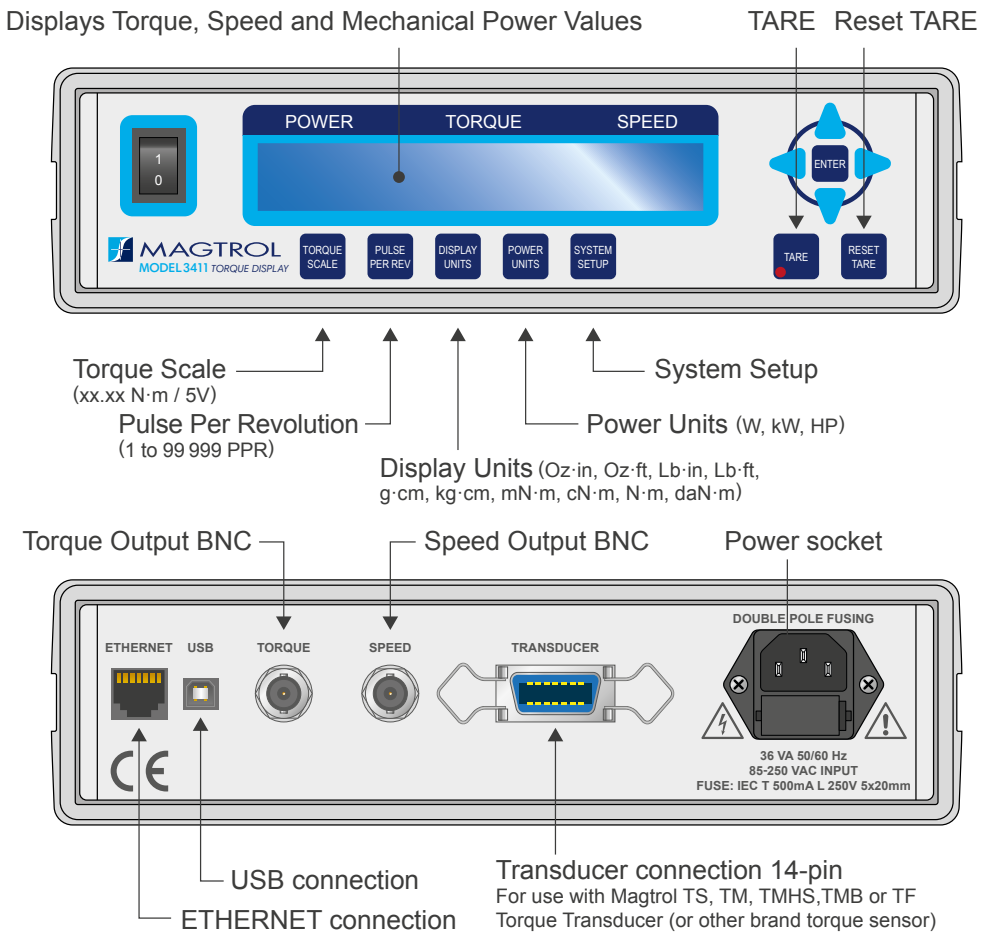
The MODEL 3411 torque display is also available in a Rack Mountable version (RMK) as well as in a portable version (HDL) with adjustable handle.

For more information, please contact our sales engineers or visit our website **www.magtrol.com**.

Fig. 2: MODEL 3411 HDL (handel) version

NOTE: 3D STEP files of most of our products are available on our website: www.magtrol.com ; other files are available on request.

PRODUCT INTERFACE



SYSTEM OPTIONS AND ACCESSORIES

CABLE ASSEMBLIES - TS SERIES

ORDERING NUMBER	ER 121 / 0	_	1

1 : Cable length 5 m
2 : Cable length 10 m
3 : Cable length 20 m
4 : Cable length 3 m

CABLE ASSEMBLIES - TM / TMB / TMHS SERIES

ORDERING NUMBER	ER 113 / 0	_	1

1 : Cable length 5 m
2 : Cable length 10 m
3 : Cable length 20 m

CABLE ASSEMBLIES - TF SERIES

ORDERING NUMBER	ER 116 / 0	_	1

1 : Cable length 5 m
2 : Cable length 10 m
3 : Cable length 20 m

SBB 14 - SIGNAL BREAKOUT BOX

Fig. 3: SBB-14 Signal Breakout Box

Magtrol's SBB 14 Signal Breakout Box is designed to assist in the monitoring of speed, torque and index signals obtained from either a Magtrol dynamometer or torque transducer. The easy-to-use SBB 14 is simply inserted in series between a Magtrol controller and any Magtrol dynamometer or torque transducer.

Speed, torque and index signals are then outputted through BNC connectors to an oscilloscope or other DAQ instrumentation device. A toggle switch is now provided to allow switching between a torque transducer and an external encoder wired to the encoder input.

ORDERING NUMBER	SBB-14

RELATED PRODUCTS

TF SERIES - TORQUE FLANGE SENSOR

Fig. 4: Torque Flange Sensors TF 313 & TF 318 with HF transmitter & signal amplifier

TF Series are the compact, bearingless and maintenance-free Torque Flange Sensor from Magtrol. Its high torsional rigidity supports direct mounting on the machine shaft or flange, avoiding the use of couplings on one side. This allows easy integration into a test system, shortens the overall length and reduces costs.

Based on strain-gauge technology, the TF Sensor use HF technology to transmit its highly accurate signal. An extrernal HF receiver transforms the signal into an analog output signal ±10 VDC. Rotational speed can be measured and converted to a TTL output signal with the optional speed pickup.

The contactless design of the Sensor permits a gap up to 5 mm between the sensor and the HF transmitter, which makes the signal acquisition insensitive to any axial or radial misalignment. Another advantage of this system is its insusceptibility to signal interference - due to the fact that, unlike other designs, the antenna does not need to be looped around the sensor.

DSP 7000 - HIGH-SPEED PROGRAMMABLE DYNAMOMETER CONTROLLERS

Fig. 5: DSP 7001 | Programmable Dynamometer Controllers

Magtrol's Model DSP 7000 High Speed Programmable Dynamometer Controller employs state-of-the-art Digital Signal Processing Technology to provide superior motor testing capabilities. Designed for use with any Magtrol Hysteresis, Eddy-Current or Powder Dynamometer, Magtrol In-Line Torque Transducer or auxiliary instrumentation, the DSP 7000 can provide complete PC control via the USB or optional IEEE-488 or RS-232 interface. With up to 500 readings per second, the DSP 7000 is ideally suited for both the test lab and the production line.

TS & TM SERIES - IN-LINE TORQUE SENSOR

Fig. 6: TM 313 & TS 106 In-line Torque Sensor

Magtrol's In-Line Torque Transducers deliver precise torque and speed measurement over a very broad range. Each model has an integrated conditioning electronic module providing 0 to ±10 VDC torque output and an open collector speed output or TTL

TM Series Torque Transducers are very reliable, providing high overload protection, excellent long term stability and high noise immunity. All transducer models employ our unique non-contact differential transformer torque measuring technology. This measuring technology offers many benefits, most notably that no electronic components rotate during operation. To provide customers with several price/performance options, Magtrol offers three torque transducer models: basic model (TMB Series), high accuracy (TM Series) and high speed with high accuracy (TMHS). The integrated electronic circuit, supplied by single DC voltage, provides torque and speed signals without any additional amplifier. The transducer is a stand-alone measuring chain.

TS Series In-LineTorque Sensors provide extremely accurate torque and speed measurement. Each model has an integrated conditioning electronic module providing 0 VDC to ±5 VDC (±10 VDC), as well as a USB interface which can be directly connected to a computer. The sensor is delivered with software allowing easy connection and data acquisition. A speed encoder provides 360 PPR (Pulse Per Revolution) in Tach A, Tach B and Index reference Z (1 PPR). TS Series sensor models are strain gauge-based measuring systems with imbedded telemetry signal transmission. Available torque ranges from 0.05 N·m to 100 N·m. Higher torque ranges will be available soon.

ORDERING INFORMATION

ORDERING NUMBER	MODEL 3411 - ___

blank : Standard version
HDL : Handel version
RMK : Rack-Mount version

Example: MODEL 3411 Torque display with handel would be ordered as : **MODEL 3411 - HDL**

MAGTROL INC
70 Gardenville Parkway
Buffalo NY 14224 | USA
phone +1 716 668 5555
fax +1 716 668 8705
e-mail magtrol@magtrol.com

MAGTROL SA
Route de Montena 77
1728 Rossens | Switzerland
phone +41 26 407 30 00
fax +41 26 407 30 01
e-mail magtrol@magtrol.ch

Offices in: Germany
France - China - India
Worldwide Distribution Network

ISO 9001 BUREAU VERITAS Certification

MODEL 3411 - FR 11/2020

2. Controls

2.1 FRONT PANEL

The front panel contains a Vacuum Fluorescent Display (VFD) that provides information about the control functions and torque transduce.

Figure 2–1 Front Panel

The buttons from left to right, top to bottom are:

- POWER SWITCH
- UP
- LEFT
- ENTER
- RIGHT
- DOWN
- TORQUE SCALE
- PULSE PER REV
- DISPLAY UNITS
- POWER UNITS
- SYSTEM SETUP
- TARE
- RESET TARE

The following table provides a quick reference on how to use each button. For more detailed information refer to *Chapter 4 – Manually Controlled Operation.*

Button	Function
POWER SWITCH	Turns power ON or OFF.
UP/DOWN	The UP/DOWN buttons function is dependent on context. When in a menu the button will scroll UP/DOWN through possible selections. When inputting a number the UP/DOWN button will increase/decrease the blinking digit.
LEFT	Moves the cursor position left.
RIGHT	Moves the cursor position right.
ENTER	Accepts current selection.

Button	Function
TORQUE SCALE	Use to enter the rated torque scale of the attached transducer. When pressed the display will change to read XX.XX N·m / 5V, where X is a digit. The blinking digit signifies the position of the cursor. The arrow keys can be used to change the number. The torque scale must be within the following range, $0.01 < x < 1.0 \cdot 10^6$
PULSE PER REV	Use to enter your encoders pulses per revolution. When pressed the display will change to the XXXX format. The valid range you can enter is from 1 to 100,000.
DISPLAY UNITS	Use to change the units that the torque is displayed in. Use the UP/DOWN arrow keys to scroll through the possible selections. Be aware that due to the mathematical conversions involved, changing units may result in the display reading zero or -OL -. When -OL- is displayed, the reading contains more digits than there is room for on the display. The possible selections include: • oz·in • oz·ft • lb·in • lb·ft • g·cm • kg·cm • mN·m • cN·m • N·m • daN·m
POWER UNITS	Use to change the units that the power reading is displayed in. Use the arrow keys to scroll through the possible selections. Be aware that due to the mathematical conversions involved, changing units my result in the display reading zero or -OL -. When -OL- is displayed, the reading contains more digits than there is room for on the display. The possible selections include: • hp • W • kW
SYSTEM SETUP	Use to change or view the current system setup information. Use the UP/DOWN arrow keys to scroll through the selection of setup options. Press ENTER to select the displayed option. To exit the setup menu select the RETURN option. The possible setup options include: • BITE • USER SETUP • STATIC IP SET • DHCP ADDRESS VIEW • FILTER SETUP • CONTRAST • SPEED BNC OUTPUT • TM INVERT • RETURN
TARE	When pressed takes the currently inputted torque reading and uses it as an offset value. The 3411 torque reading will now display 0.0 when the torque value read is the same as when the TARE button was pressed.
RESET TARE	Resets the TARE value to the original calibrated value.

2.2 REAR PANEL

The rear panel provides connectors and receptacles for connecting to appropriate equipment.

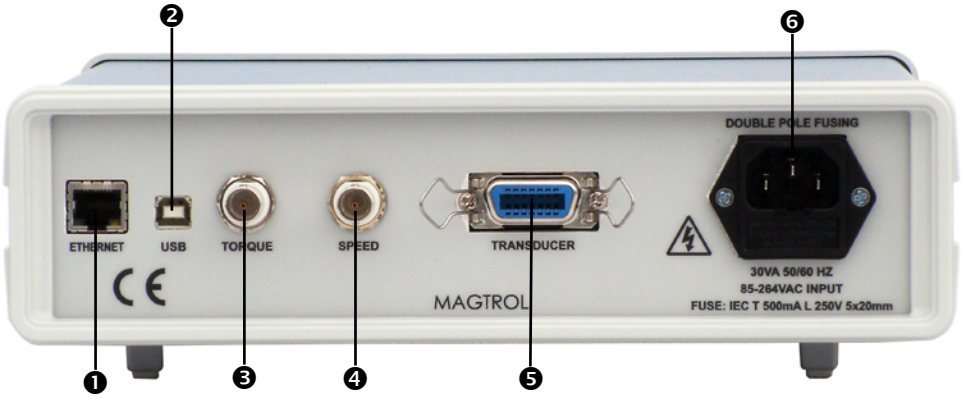


Figure 2–2 Rear Panel

2.2.1 REAR PANEL INPUTS AND OUTPUTS

❶ ETHERNET — Attach Ethernet cable here.

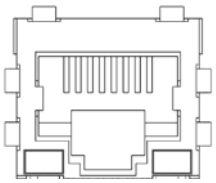


Figure 2–3 Ethernet Connector

❷ USB — Isolated USB Connector

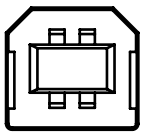
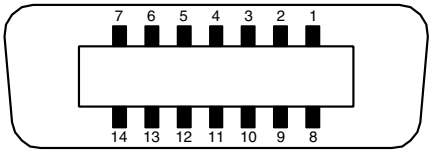


Figure 2–4 USB Connector

❸ Torque Output — Attach Torque Output cable here

❹ Speed Output — Attach Speed Output cable here

❺ TRANSDUCER Connect transducer signal cable here.



1. N/C	8. 5 V COM
2. TACH B	9. N/C
3. +24 VDC	10. TACH A
4. +24 VDC COM	11. N/C
5. +24 VDC COM	12. BITE
6. N/C	13. TORQUE COMMON
7. 5 V OUT	14. TORQUE SIGNAL

Figure 2–5 Transducer Connector

❻ POWER Attach IEC approved power cord here.

3. Installation/Configuration

Note: Before installing the 3411, you should become familiar with the front and rear panels, as outlined in *Chapter 2–Controls*.

3.1 POWERING UP THE 3411

Note: The case of the 3411 is earth grounded to reduce the risk of electric shock.

3.1.1 LINE VOLTAGE

The 3411 will operate with either of the following power sources without any modifications:

- 120 V 50/60 Hz
- 230 V 50/60 Hz

3.1.2 SELF-TEST

Note: To make sure that the 3411 is operational, a Magtrol torque sensor must be installed and connected to the 3411.

1. Connect the 3411 to the torque transducer using a 14-pin to 6-pin signal cable.

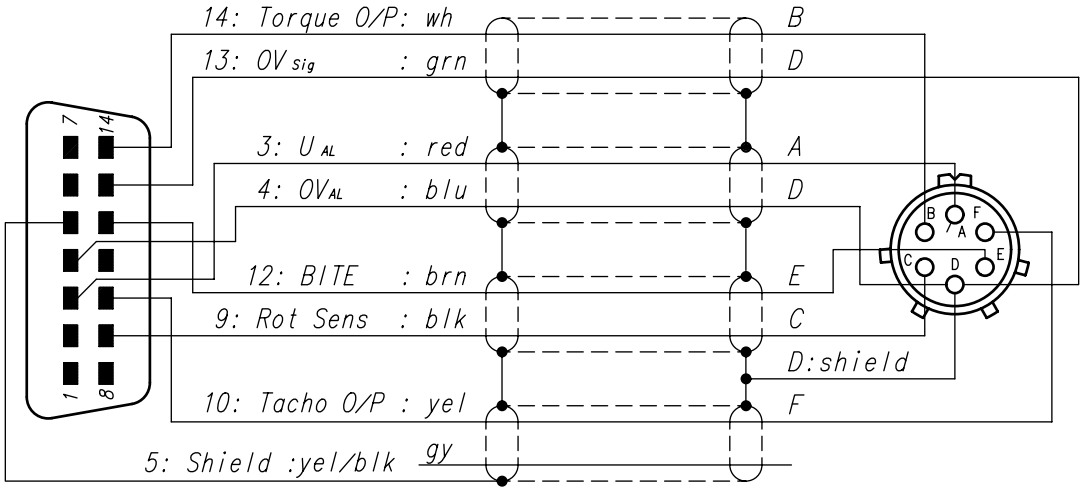


Figure 3–1 Cable and Connection Diagrams

2. Turn the power on. The 3411 Title Display will appear first, followed by the currently loaded firmware and FPGA versions.

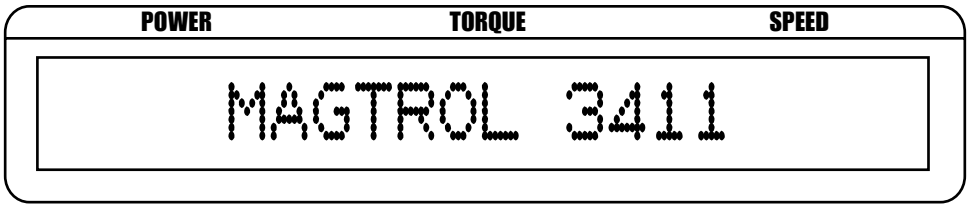


Figure 3–2 Title Display 1 (up to 1 minute)

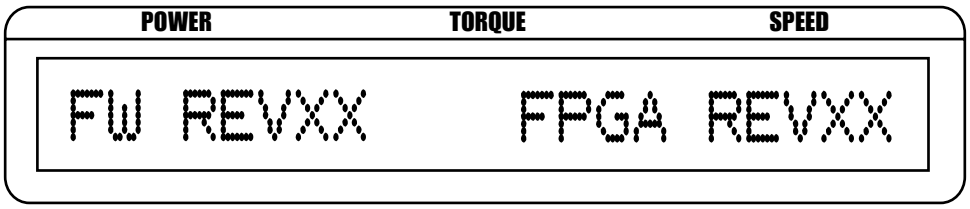


Figure 3–3 Title Display 2 (5 seconds)

3.1.3 Default Display

When the 3411 is ready for use, the current power, torque and speed readings will appear on the display.

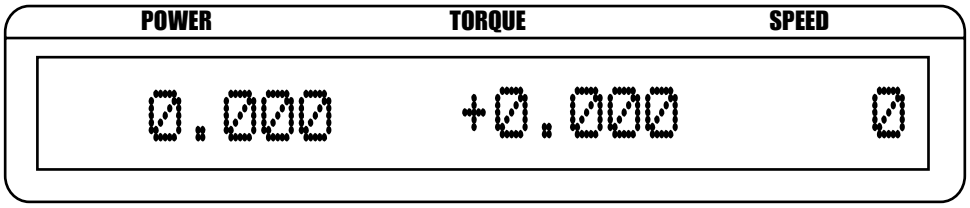


Figure 3–4 Default Display

4. Manually Controlled Operation

4.1 SETTING DESIRED OPERATING PARAMETERS

4.1.1 Torque Scale Setup

Select the Torque Scale.

1. Press the TORQUE SCALE button. The display will appear as follows:

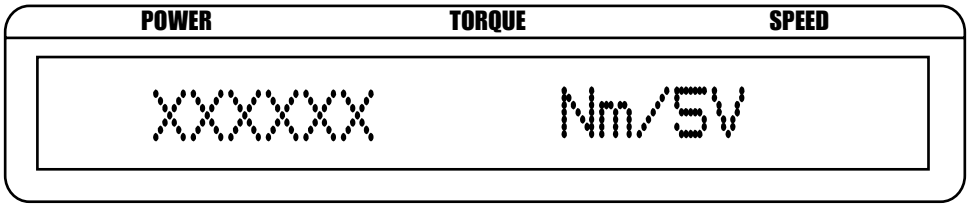


Figure 4–1 Torque Scale Setup

2. Press the arrow buttons until desired torque scale appears in display.
3. Press the ENTER button to save and return to the Default Display.

4.1.2 Pulse Per Rev Setup

Select the encoders pulses per revolution value.

1. Press the PULSE PER REV button. The display will appear as follows:

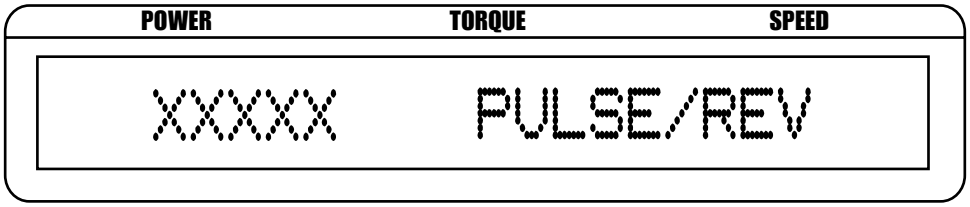


Figure 4–2 Pulse per Rev. Setup

2. Press the arrow buttons until desired pulse per rev appears in display.
3. Press the ENTER button to save and return to the Default Display.

4.1.3 Display Units Setup

Changes the torque readings displayed units of measure. Options include:

- oz·in
- oz·ft
- lb·in
- lb·ft
- g·cm
- kg·cm
- mN·m
- cN·m
- N·m
- kN·m
- daN·m

OPERATION

1. Press the DISPLAY UNITS button. The display will appear as follows:

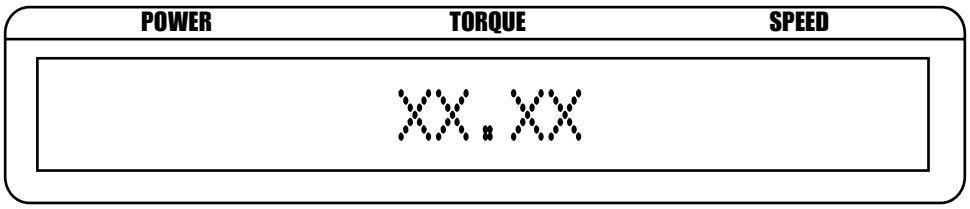


Figure 4–3 Display Units Setup

2. Press the UP/DOWN arrow buttons until desired display unit appears in display.
3. Press the ENTER button to save and return to the Default Display.

4.1.4 Power Units Setup

Changes the power readings displayed unit of measure. Options include:

- Watts
- kW
- hp

1. Press the POWER UNITS button. The display will appear as follows:

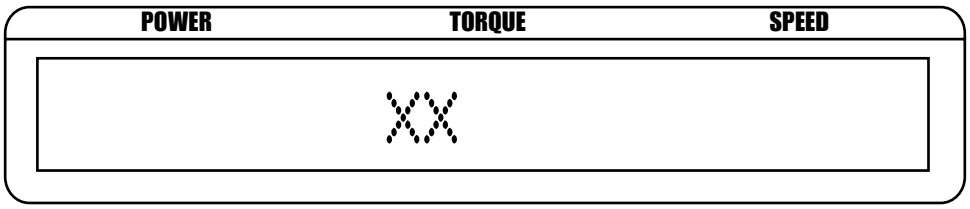


Figure 4–4 Power Units Setup

2. Press the UP/DOWN arrow buttons until desired power unit appears in display.
3. Press the ENTER button to save and return to the Default Display.

4.1.5 System Setup

Allows user to enter 3411's system setup menu options. Submenus include:

- BITE
- USER SETUP
- IP ADDRESS VIEW
- FILTER SELECTION
- CONTRAST
- SPEED BNC OUTPUT
- TM INVERT
- RETURN

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until desired setup option appears in display.
3. Press the ENTER to go to the setup menu for that option.

4.1.5.1 BITE

The Built-In Test Equipment (BITE) function activates a five second test to ensure that your system is properly connected and each instrument is correctly operating. BITE activates an internal NPN transistor configured as an open collector. The transistor output is found on pin 12 of the 14 pin transducer receptacle. The output signal will trigger the internal circuitry of the connected transducer. When the transducer receives this signal it will output its full scale voltage value plus any offset value. The voltage the transducer outputs will show on the front panel of the 3411. The full scale output voltage for the TM series transducers is 5 volts, while the TF series will output 4 volts.

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until BITE shows in the display.
3. Press ENTER. The BITE function will activate for 5 seconds and then return to the Default Display. While BITE is active the connected transducers output voltage will be displayed in the following format:

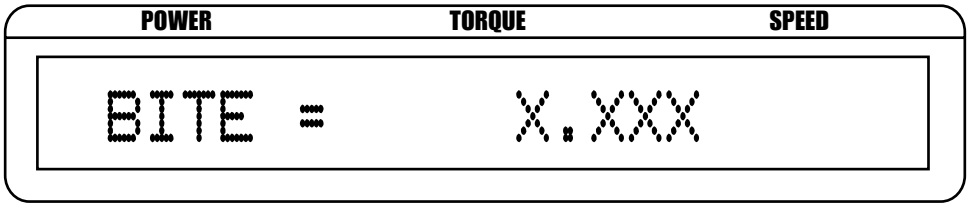


Figure 4–5 BITE Setup

4.1.5.2 User Setup

The 3411 allows the user to save up to four separate user configurations. Each configuration can have a separate setting for each of the following; torque scale, encoder pulse per revolution, torque display units, power display units, filter input selection, and analog or digital speed input selection. When you change to another user setup, all the settings of that user setup are loaded. Any manual changes made to these settings while a particular setup is active are saved automatically. If a Mag. NET command changes a setting, you must also use the Mag.NET command "SAVE" to have it remain part of the active user setup.

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until USER SETUP shows in the display.
3. Press ENTER to go to the user setup menu.
4. Press and release UP/DOWN arrow buttons until the desired user setup number appears in the display. The display will appear as follows:

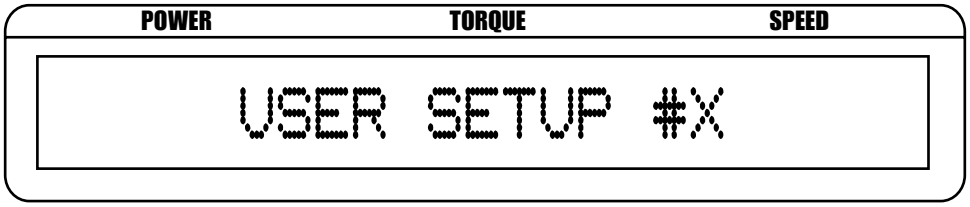


Figure 4–6 User Setup

5. Press ENTER to load the selected the user setup and return to the Default Display.

4.1.5.3 IP Address View

Displays the 3411's current IP address.

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until IP ADDRESS VIEW shows in the display.
3. Press ENTER to view the 3411's IP Address. The display will appear as follows:

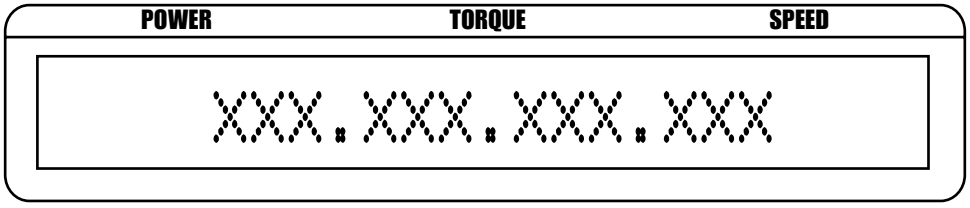


Figure 4–7 IP Address View

4.1.5.4 Filter Selection Setup

Sets the desired filter selection for the 3411. The options include:

- None
- 2 Hz
- 5 Hz
- 10 Hz
- 20 Hz
- 50 Hz
- 100 Hz

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until FILTER SELECTION shows in the display.
3. Press ENTER to go to the filter selection menu. The display will appear as follows:

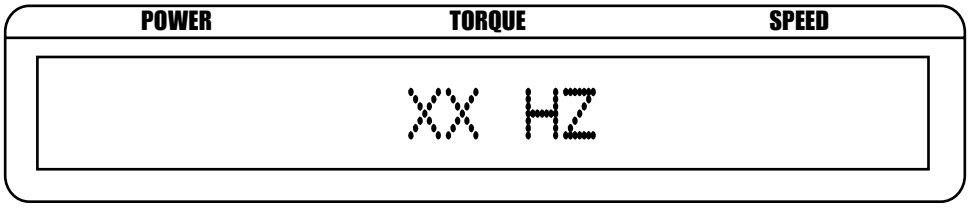


Figure 4–8 Filter Selection Setup

4. Press the UP/DOWN arrow buttons until the desired filter selection appears in the display.
5. Press ENTER to save and return to the Default Display.

4.1.5.5 Contrast

The 3411 is shipped with the contrast programmed to the lowest setting in order to prolong display life. There are 3 levels of contrast, 1 is the lowest, 3 is the highest. If it is necessary to increase the contrast to improve readability, execute the following steps:

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until CONTRAST shows in the display.
3. Press ENTER to go to the contrast setup menu. Display will appear as follows:

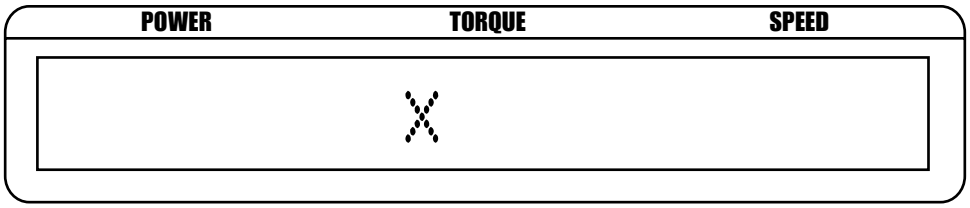


Figure 4–9 Contrast Setup

4. Press the UP/DOWN arrow buttons until the desired contrast setting shows in the display.
5. Press ENTER to save and return to the Default Display.

4.1.5.6 Speed BNC Output Setup

Use to select either digital or analog output to the rear panel Speed BNC. When analog speed output is selected, you are further prompted to input an RPM to volt scale in the following range:

$1 < x < 1.0 * 10^6$

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until SPEED BNC OUTPUT shows in the display.
3. Press ENTER to go to the speed BNC output setup menu.
4. Press the UP/DOWN arrow buttons until the desired speed BNC output is shown in the display.
5. Press ENTER to select analog or digital. If you selected digital,the setup is complete and the display will return to the Default Display. If you selected analog the display will appear as follows:

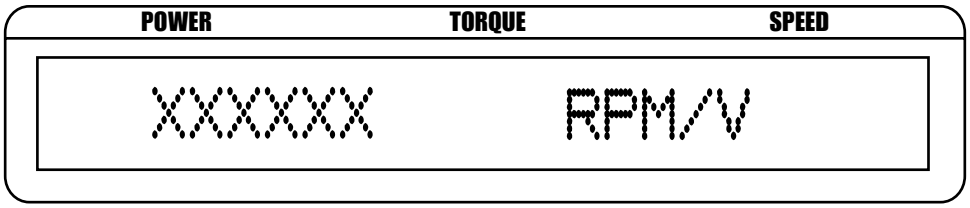


Figure 4–10 Analog Speed BNC Output Setup

6. Press the UP/DOWN arrow buttons until the desired speed BNC output appears in the display.
7. Press ENTER to save and return to the Default Display.

4.1.5.7 TM Invert Setup

1. Press the SYSTEM SETUP button.
2. Press the UP/DOWN arrow buttons until TM INVERT shows in the display.
3. Press ENTER to go to the TM invert setup menu. The display will appear as follows:

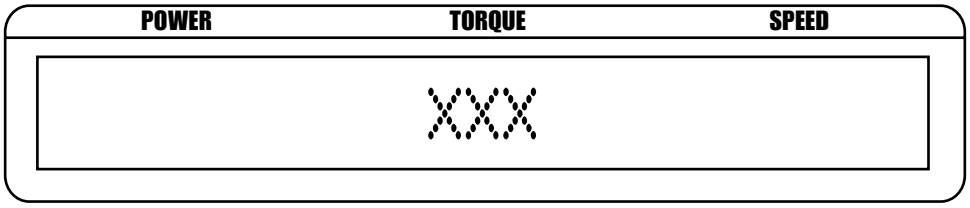


Figure 4–11 TM Invert Setup

4. Press the UP/DOWN arrow buttons until the desired TM invert selection appears in the display.
5. Press ENTER to save and return to the Default Display.

4.1.6 TARE BUTTON

The torque offset voltage may be changed using the tare button. The torque input voltage when tare is activated will be used as an offset and the torque reading will go to zero.

1. Press TARE button.
2. The red LED will turn on to indicate the tare function is active.

4.1.7 RESET TARE BUTTON

Used to reset any tare offset voltage back to the original calibrated setting.

1. Press the RESET TARE button.

NOTE: Pressing RESET TARE while tare is not active will have no effect.

5. Computer Controlled Operation

The 3411 can be interfaced to a personal computer using two different methods, USB and Ethernet. Through these two interfaces, there are two methods to control the 3411. One method is through a web interface, which is only available over Ethernet. The second method is a set of Mag.NET commands, which are fully described in the next chapter. Mag.NET commands are human readable ASCII text strings which may be sent to the 3411 using either USB or Ethernet. Any program which can open a connection to the 3411 via USB or Ethernet can control the unit using Mag.NET commands. This includes « HyperTerminal », « TeraTerm » and « PuTTY »; as well as custom programs written in LabVIEW™, Java, and C. TORQUE software is a LabVIEW™ program written by Magtrol which can interface with the 3411.

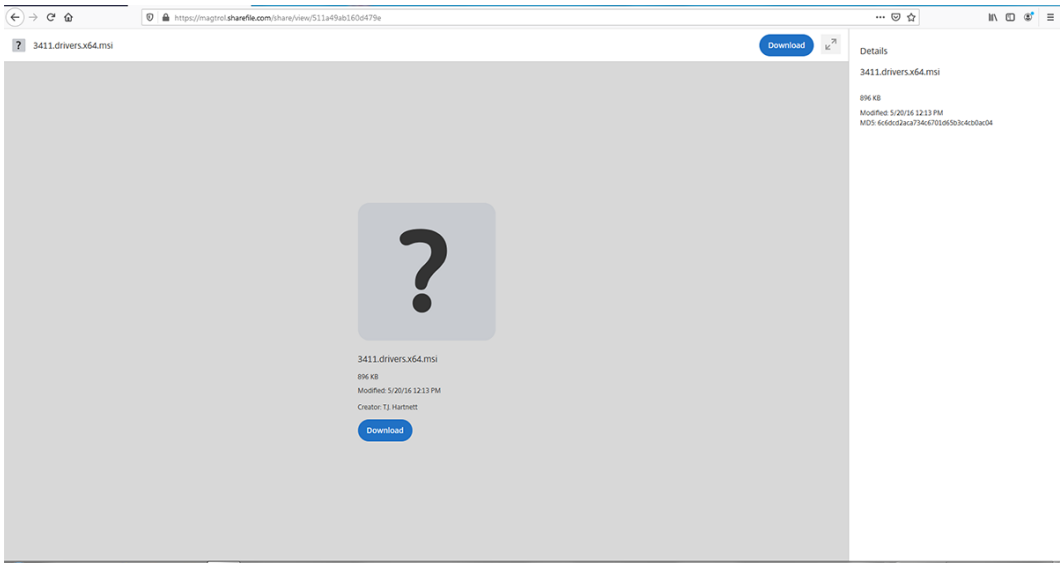
5.1 ABOUT THE USB INTERFACE

The USB interface is standard on the 3411. The USB interface will be converted to a serial port in the PC. The USB driver must be installed in order for the 3411 to communicate with the PC.

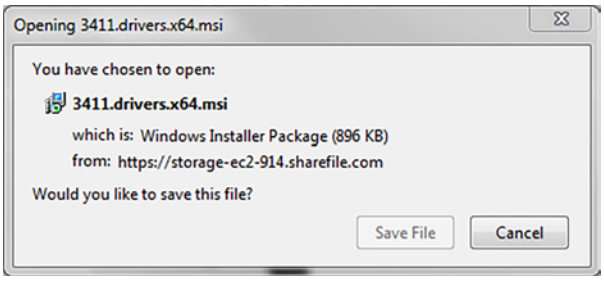
5.1.1 USB DRIVER SETUP FOR WINDOWS OPERATION SYSTEM

Go to the software downloads page on the Magtrol website: www.magtrol.com/software-downloads/. Scroll down to 3411 USB Drivers.

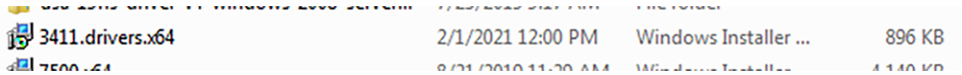
1. Select the proper number of bits for your operating system, and the firmware revision of your 3411. The revision can be seen on the front panel display, left side, when powering up.
2. You will be asked for some basic information about yourself. Complete the fields and press continue.
3. On the next screen press download.



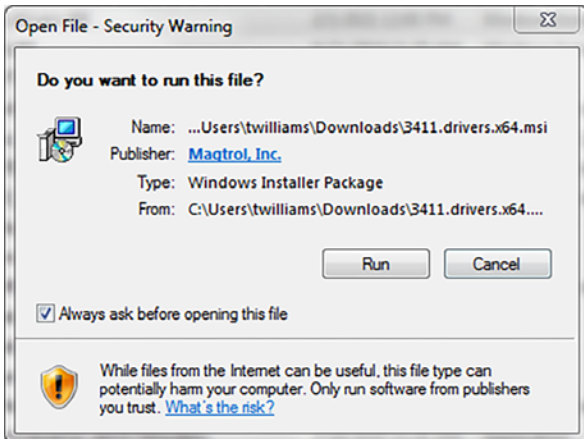
4. Save the file when asked.



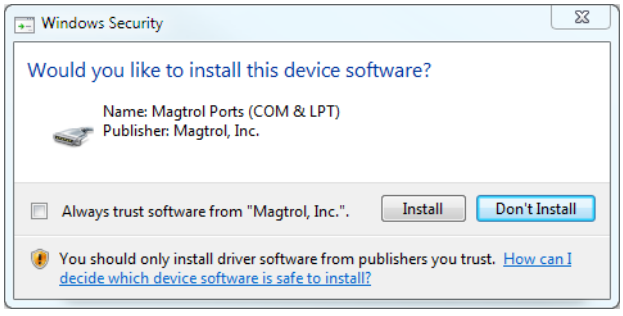
5. A self-installing MSI file will be located in your downloads folder.



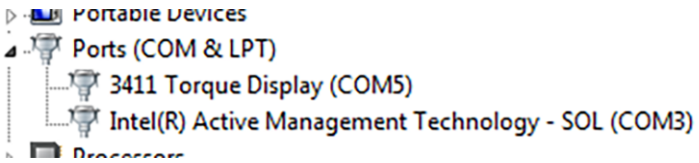
6. Double-click 3411.drivers.x64.msi for the 64-bit operating system and press run.



7. Windows security will ask if you would like to install the device software. Press install.



8. After successful installation you may plug in the USB cable from your 3411 to the computer.
9. Checking device manager, you should now see the 3411 showing as a COM port.



5.2 CONNECTING THE 3411 USING ETHERNET

When using Ethernet, connect the 3411 to a switch, a router, or a wall outlet as you would another personal computer. By default, the 3411 is assigned an IP address by DHCP. To discover what IP address it has been assigned, click the SYSTEM SETUP button on the front panel and select the IP ADDRESS VIEW option. (Refer to section 4.1.5.3 of the manual). If it is necessary that your 3411 use a static IP, you may use either the web interface or a set of Mag.NET commands to assign one. The web interface method is discussed in section 5.3.3, while the Mag.NET commands are described in chapter 6.3

5.3 WEB INTERFACE OPERATION

To access the web interface of the 3411, you must know the IP address of your unit. Once the units IP address is know, open a web browser on any computer in the same local network as your 3411 and type the units IP into the address bar. Alternatively, you can use http://magtrol3411/ to access the web interface. The web interfaces home page is depicted below.

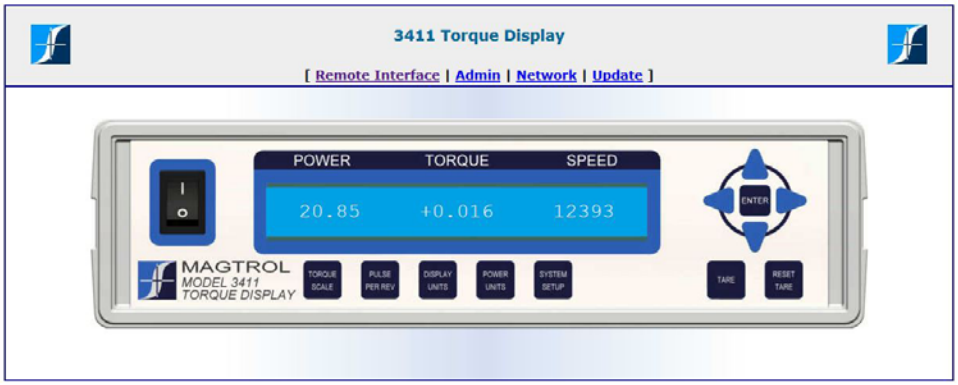


Figure 5–1 3411 Web interface home page

5.3.1 REMOTE CONTROL OPERATION

The opening page of the web interface displays the front panel of your 3411 unit. The operation of the 3411 through the remote interface is exactly the same as manually controlled operation with the mouse pointer replacing your finger. A mouse click acts as if you were physically pushing the button, except for the following caveats. Whenever you are prompted to input a number, such as the torque scale or encoder pulse per revolution, you cannot use the arrow buttons to change this number. You must now click over the displayed value and use the keyboard to type it. Once you have typed in the value, you can either press enter on the keyboard or use your mouse to click the enter button on the display. If the number entered is valid, and the setting is successfully saved to the unit, the fonts color will change to green for a few second before reverting back to displaying the current power, torque and speed.

When a user is remotely controlling the unit via the web interface, the unit will lock the keypad to prevent any simultaneous changing of settings. The 3411 will also blink on the display the actions the remote user is giving to the unit. In a similar fashion, when a person physically present to the unit is changing a setting, any button presses on the web interface will result in the interface "shaking" on the screen.

5.3.2 ADMINISTRATION SETTINGS

If desired, you may add security to protect access to the remote control panel. Just select a username and password and hit the "Turn Security On" button. This will prevent users from changing any of the unit's settings, as well as prevent the viewing of all of the other pages. Users will still be able to view the current power, torque and speed readings without a valid username password combination. To turn security off, you must know the current username and password. If the username or password is forgotten, it can be reset to the default (admin/admin) by sending the "AUTH" command over USB (section 6.3).

Figure 5–2 3411 Administration Settings

5.3.3 NETWORK SETTINGS

You can change from DHCP to a statically set IP address using the network settings page. When the page is loaded, the current values are loaded in the appropriate locations. When using DHCP, the IP address, net mask, and gateway text inputs boxes are disabled. To enable them, uncheck the DHCP checkbox and fill in the desired values. Click the update button to have the settings take effect. Once the new settings are valid, the web interface will provide a button which will reload the page at its new address.

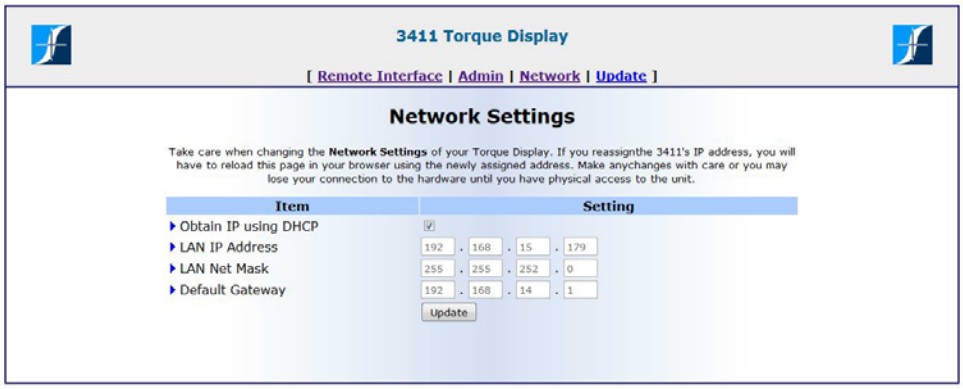


Figure 5–3 Network Settings

5.3.4 UPDATE FIRMWARE

It is now possible to remotely update the 3411's firmware via the web interface. Just select the update file and click the change firmware button. The "Change Firmware" button will not be enabled until a valid update file has been selected. Once the update process has completed the 3411 will reboot with the new version of the firmware installed.

Figure 5–4 Update Firmware

5.4 MAG.NET COMMANDS

In order to use the Mag.NET command set, you must first establish a connection with the 3411. There are currently three methods to do so, two through USB and one through Ethernet. The commands themselves will be described in the next chapter.

5.4.1 USB Communication Device Class Connection

You may connect to the 3411 using Hyper-terminal, Tera-Term, Putty or any custom program which can open a Virtual COM Port. The following are the valid communication parameters for the RS-232 connection:

- No parity
- 8 Data Bits
- 1 Stop bit
- No protocol
- 921600 Baud rate

5.4.2 USB Test and Measurement Class Connection

If you have LabVIEW installed on your computer, you may use the VISA Interactive Control program to connect to your 3411. VISA Interactive Control is a separate program written by National Instruments meant to test communication with any VISA compliant instrument. By implementing the Test and Measurement Class Specification, the 3411 is now VISA compliant.

It is possible to write custom LabVIEW programs using VISA control blocks to connect the 3411. You must know the VISA instrument descriptor of the 3411 to do so. The instrument descriptor will follow this format:

USB[board]:: manufacturer ID:: model code:: serial number[:: USB interface number]::INSTR.
For the 3411 it will appear as USB0::0xxxxx::0xxxxx::[units serial number]::INSTR.

Writing LabVIEW programs is beyond the scope of this manual, however there are examples implementing this technique found on the Magtrol homepage.

5.4.3 Ethernet Connection

You may use LabVIEW or any other programming language to write a custom program using sockets to open a connection to the 3411. The unit listens on port 3411 for any incoming connections. It is beyond the scope of this manual to discuss sockets programming, however, there are examples programs implementing this technique available on the Magtrol homepage. Download the Mag. NET zip located in the downloads section of the web page. This page can be reached under the support menu tab.

6. Mag.NET Commands

The Mag.NET command set has been developed by Magtrol to communicate with our devices through a personal computer. All commands consist of ASCII text and are terminated by a carriage return line feed combination. In hex this is 0x0D 0x0A, or as part of a string they can be typed as "\r\n".

6.1 COMMUNICATION COMMANDS

Command Code	Function	Explanation
*IDN?	Returns Magtrol identification and software revision.	Example: 3411 A0 B0
OD	Prompts to return speed-torque-direction data string.	Output Data prompt to return data string with this format: SxxxxxxTxxxxxRcrlf or SxxxxxxTxxxxxLcrlf R or L are used to indicate the polarity of the torque and may be used as a shaft direction indicator where: 1. With TM INVERT off: R will indicate positive L will indicate negative The speed will equal the displayed value and the torque will be in the same units as displayed on the front panel.
OP	Reads quadrature position	Quadrature position counter returns data string with 8 digit hex number.
OS	Reads speed	Read speed with four decimal digits.
OV	Reads voltage	Reads voltage applied to Torque input mV. Output sign follows the TM INVERT setting.
QR	Reset position counter	Resets the position counter to zero at current position. Quadrature Timer is not reset
OB	Output Binary Data	User can read up to 8 words data at a rate of 500 times per second . Please refer Output Binary table.
BITE	Activates BITE for 5 seconds	Built In Test Equipment command.

6.2 SETUP COMMANDS

Command Code	Function	Explanation

AF#	Sets filter	Values for # are:
		0 = None 4 = 20 Hz
		1 = 2 Hz 5 = 50 Hz
		2 = 5 Hz 6 = 100 Hz
		3 = 10 Hz

M0	Front panel lockout	Front panel lockout, keys will not function.
M1	Front Panel enable	Front Panel enable, keys will function.

SPS#	Speed selection	Values for # are:
		0 = Digital TachA output on pack panel BNC
		1 = Analog speed output on pack panel BNC

SPSFxx.xx	Analog speed scale factor	Values for xx.xx range from 1 to 999,999.
TR	Resets Tare	Resets tare to calibrated 0 (zero).
TS	Sets Tare.	Reads current torque and uses as tare value.
UE#	Sets encoder units to #	Values for # range from 1 to 99999

UP#	Sets the Power Units.	Values for # are:
		0 = hp
		1 = W
		2 = kW

UR#	Sets display torque units to #.	Values for # are:
		0 = oz•in 6 = mN•m
		1 = oz•ft 7 = cN•m
		2 = lb•in 8 = N•m
		3 = lb•ft 9 = kN•m
		4 = g•cm 10 = daN•m
		5 = kg•cm
		Torque unit conversion defaults to Nm if out of range.

UT#	Sets torque scale to #	Values for # range from 0.01 to 999999
INVERT#	Negates the incoming Voltage (Torque signal)	Values for # 0 Non Inverted (default value) 1 Inverted
USER#	Selects configuration number	Values for # 1,2,3,4 **NOTE:** If a USER SETUP is changed via the USB or Ethernet it is volatile until SAVE command is sent.
SAVE	Save set up	Save set up to current user configuration
SERIAL?	Returns Magtrol assigned serial number	

6.3 LAN SETUP COMMANDS

Command Code	Function	Explanation

DHCP#	Enables/Disables DHCP use. You must send the "UPD" command after sending DHCP# for the change to take place. When disabling DHCP, you must also set a static ip, a gateway and a subnet netmask prior to sending the "UPD" command. Contact your network administrator for the appropriate network settings.	Values for # are:
		1 = Enable
		0 = Disable

DHCP?	Read current DHCP state	Return #: 1 = Enable 0 = Disable
IPAD, XXX.XXX.XXX	Sets the static ip address. You must send the "UPD" command after "IPAD,xxx.xxx.xxx.xxx" for the new setting to take effect.	If DHCP is enabled, setting the static ip address has no effect. Contact your network administrator for details.
IPAD?	Read current IP address	Typical Return: 192.168. 14. 35
GATEWAY, XXX.XXX.XXX.XXX	Sets the gateway address used. You must send the "UPD" command after "GATEWAY,xxx.xxx.xxx.xxx" for the new setting to take effect.	If DHCP is enabled, setting the gateway address has no effect. Contact your network administrator for details.
GATEWAY?	Read current default gateway address	Typical Return: 192.168. 14. 1
HOST?	Read current local host name	Typical return: M34110001
MAC?	Read MAC address	Typical return: 02AA00000002
SMAS, XXX.XXX.XXX.XXX	Sets the subnet netmask. You must send the "UPD" command after "SMAS,xxx.xxx.xxx.xxx" for the new setting to take effect.	If DHCP is enabled, setting the netmask has no effect. Contact your network administrator for details.
SMAS?	Read current subnet mask	Typical return: 255.255.255.0

Command Code	Function	Explanation
UPD	Saves all LAN settings to non-volatile memory and activates them.	To disable DHCP, the static ip, gateway, and netmask commands must have been given prior to sending “UPD”. If DHCP is already disabled, “UPD” may be used to change a single static network setting, i.e. only the netmask, or only the gateway. Contact your network administrator for details.
WHOST, XXXXXXXXXXXXXXX	Save new local host name to non-volatile memory and activate new host name	xxxxxxxxxxxxxxx: String of up to 15 characters. Must start with letter (A-Z) May contain letters, numbers (0-9), or dashes (“-”)
AUTH	Resets web interface username password to admin/ admin	Only available through USB Interface.

6.4 CALIBRATION AND MISCELLANEOUS COMMANDS

Command Code	Function	Explanation
MODE#	User/Calibration mode	Values for # 0 User 1 Calibration/engineering
MODE 1 COMMANDS		
INIT	Reset to factory defaults	Caution calibration will be lost. *POWER cycle required after the command.
IOAOX.XXX	Write the value to DAC	Write the value to the Speed DAC. Volts are assumed. X.XXX floating point voltage value 3 decimal places +10.000 to -10.000
CAL	Command to start A/D Calibration	Response is ZERO
ZERO	Command to accept applied zero	Response is FS=X.XXX prompting the user to apply Full Scale
FS=X.XXX	Command to set the Positive Full Scale (gain)	User enters X.XXX (meter reading) Response is FN=-X.XXX
FN=X.XXX	Command to set the Negative Full Scale (gain)	User enters X.XXX (meter reading) Response is CAL COMPLETE
CALS	Command to start frequency Calibration	Response is FREQ=XXXXX.XX prompting the user to apply frequency
FREQ= X.XXX	Command to set the frequency correction	User enters X.XXX (meter reading) in Hz Response is CAL COMPLETE
CALDAC	Command to start DAC Calibration	Response is READ ZERO
ZDAC=X.XXX	Command to set applied zero	User enters X.XXX (meter reading) Response is ZERO OK?
ZERO OK	Command to accept DAC zero	Response is FSDAC=X.XXX
FSDAC= X.XXX	Command to set the Positive Full Scale (gain)	User enters X.XXX (meter reading) Response is FS OK?
FS OK	Command to accept DAC gain	Response is CAL COMPDAC
OV	Reads Voltage	Reads voltage applied to Torque input mV. Output sign follows the TM INVERT setting.

SPS#	Speed selection	Values for # are:
		0 = Digital TachA output on pack panel BNC
		1 = Analog speed output on pack panel BNC

6.5 OUTPUT BINARY TABLE

Number	Data	Description	Data Type
0	TimeH	Time stamp: the first 32 bit value	Integer
1	TimeL	Time stamp: the last 32 bit value	Integer
2	Display speed	Speed derived by using a 0.2 second gate (slow) Display value	Float
3	Torque display	Torque derived by using a heavily average (slow) Display value	Float
4	Quadrature counter	Quadrature Position counter	Integer
5.	Quadrature time	Quadrature Position Time	Integer
6	Speed	Speed derived by using an averaged time between edges. (fast)	Float
7	Torque	Torque value “2 ms” value	Float

7. Calibration

7.1 CLOSED-BOX CALIBRATION

The 3411 features closed-box calibration. The advantage of closed-box calibration is that the user does not have to disassemble the case or make any mechanical adjustments to the 3411.

The torque readout can be calibrated using external reference sources. Correction factors for offset and gain are stored in nonvolatile memory. They remain in effect until the user or the calibration house updates them.

7.2 CALIBRATION SCHEDULE

Calibrate the 3411:

- After any repairs are performed.
- At least once a year; more frequently to ensure required accuracy.

7.3 BASIC CALIBRATION PROCESS

The basic calibration process consists of three steps which must be performed in the following order:

1. Initial Procedure
2. Torque Offset and Gain
3. Frequency Gain

Items needed for calibrating the 3411:

- External voltage reference of 0 to 10 volts DC
- Digital multimeter (DMM)
- Frequency generator capable of generating a square wave 0V to 5V
- Frequency meter capable of a measuring square wave 0V to 5V

Both measuring instruments should have a accuracy of 0.005% or better.

7.3.1 INITIAL CALIBRATION PROCEDURE

1. Allow the 3411 to stabilize in an environment with:
   - An ambient temperature of 18°C to 25°C.
   - Relative humidity less than 80%.
2. Turn on the 3411.
3. Allow the 3411 to warm up for at least 30 minutes.

7.3.2 TORQUE OFFSET AND GAIN

Connect the external voltage reference common to the input connector.

- Pin 13 of the transducer connector

Connect the external voltage reference high to the input connector.

- Pin 14 of the transducer connector

CAUTION: SET THE FILTER SELECTION TO NONE BEFORE STARTING THE CALIBRATION PROCESS.

1. Send the command MODE1 to the unit.
2. Send the command CAL to the unit.
3. The response will be ZERO VOLTS.
4. Apply 0.0000 volts to the input.
5. Send the command ZERO.
6. The response will be FS=X.XXXX
7. Apply approximately 10.0000 VDC to the input (this can vary a few mV but must be measured accurately).
8. Send the command FS=X.XXXX (where X.XXXX is your meter reading).
9. The response will be FN=-X.XXX.
10. Apply approximately -10.000 VDC. This can vary a few mV.
11. Send the FN=-XX.XXX command where -XX.XXX represents the voltage applied.
12. The unit will respond CAL COMPLETE.
13. Send the command MODE0 to the unit.

7.3.3 SPEED DAC CALIBRATION

1. Send the command MODE1 to the unit.
2. Connect a voltmeter to the Speed BNC Output.
3. Send the CALDAC command.
4. The response will be READ ZERO.
5. User will read the meter and send the ZDAC=XX.XXX command where XX.XXX represents the voltage read. This offset is immediately applied.
6. The hardware will respond “ZERO OK?”
7. If the meter reading is not zero the user must return to step 3.
8. If the meter reading is within 3 mv of 0 the user responds “ZERO OK.”
9. The unit will respond “READ FS.”
10. User will read the meter and send the FSDAC=XX.XXX command where XX.XXX represents the voltage read. This gain is immediately applied.
11. The hardware will respond “FS OK?”
12. If the meter reading is not 9 volts ± 3 mv the user must return to step 8.
13. If the meter reading is 9 volts ± 3 mv the user responds “FS OK.” The unit will respond CAL COMP DAC.
14. Send the command MODE0 to the unit via USB.

7.3.4 FREQUENCY GAIN

1. Send the command MODE1 to the unit.
2. Send the command CALS to the unit.
3. The response will be FREQ=XXXXXX.XX.
4. Apply a square wave of 50 kHz to 99 kHz to the input. (This can vary from 50 kHz to 99 kHz but must be measured accurately).

5. Send the command FREQ=XXXXXX.XX (where X.XXXX is your speed meter reading in Hz).
6. The response will be CAL COMPLETE.
7. Send the command MODE0 to the unit via USB.

8. Theory

8.1 FILTER PARAMETERS

The digital filters of the 3411 are used to remove undesired noise from the TSC inputs. This noise could be conducted from electrical sources or mechanical vibrations.

The input of the A/D converter internal to the 3411 has a traditional analog filter that is comprised of the following characteristics:

- -3db Point: 3.8 kHz
- A/D Sample Rate: 7812.5 Hz
- 16 acquired and averaged samples: average applied to filter at a rate of 488.28125 Hz
- Filter Cutoff Frequencies: 2 Hz, 5 Hz, 10 Hz, 20 Hz, 50 Hz, 100 Hz
- Filter Output: Equivalent to second order Butterworth analog filter
- Transposed Direct Form II Architecture: The diagram below shows this architecture.

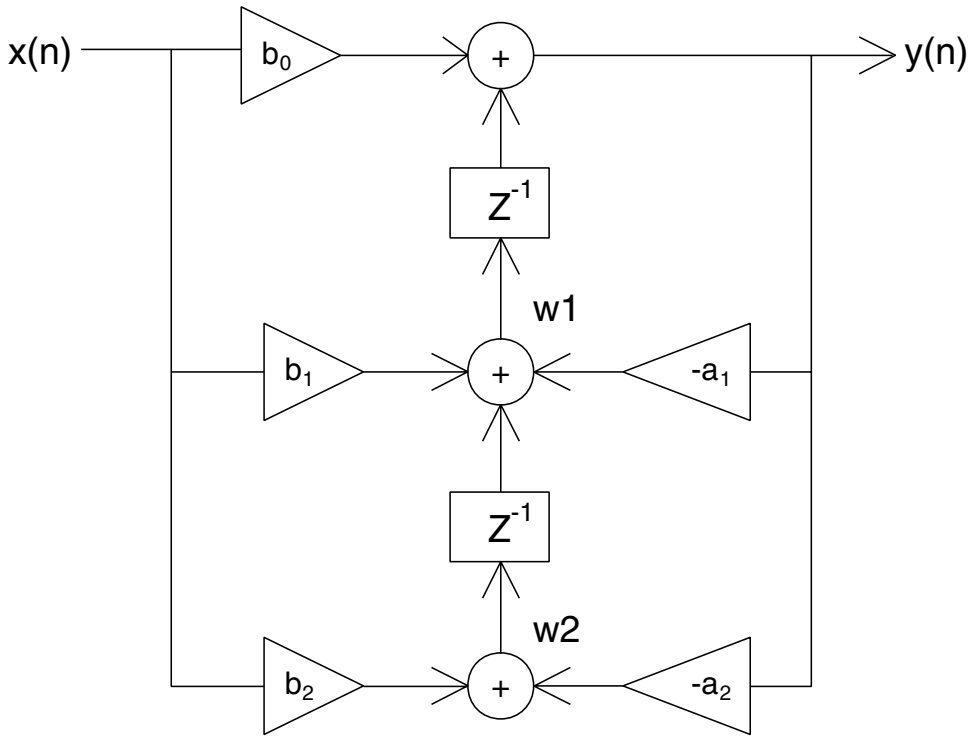


Figure 8–1 Transposed Direct Form II Architecture

With a digital filter, the 3411 is able to solve the following equations:

$y(n) = b_0 * x(n) + w1$

$w1 = b_1 * x(n) - a_1 * y(n) + w2$

$w2 = b_2 * x(n) - a_2 * y(n)$

The equations are applicable to each channel, occurring every 2.48 milliseconds.

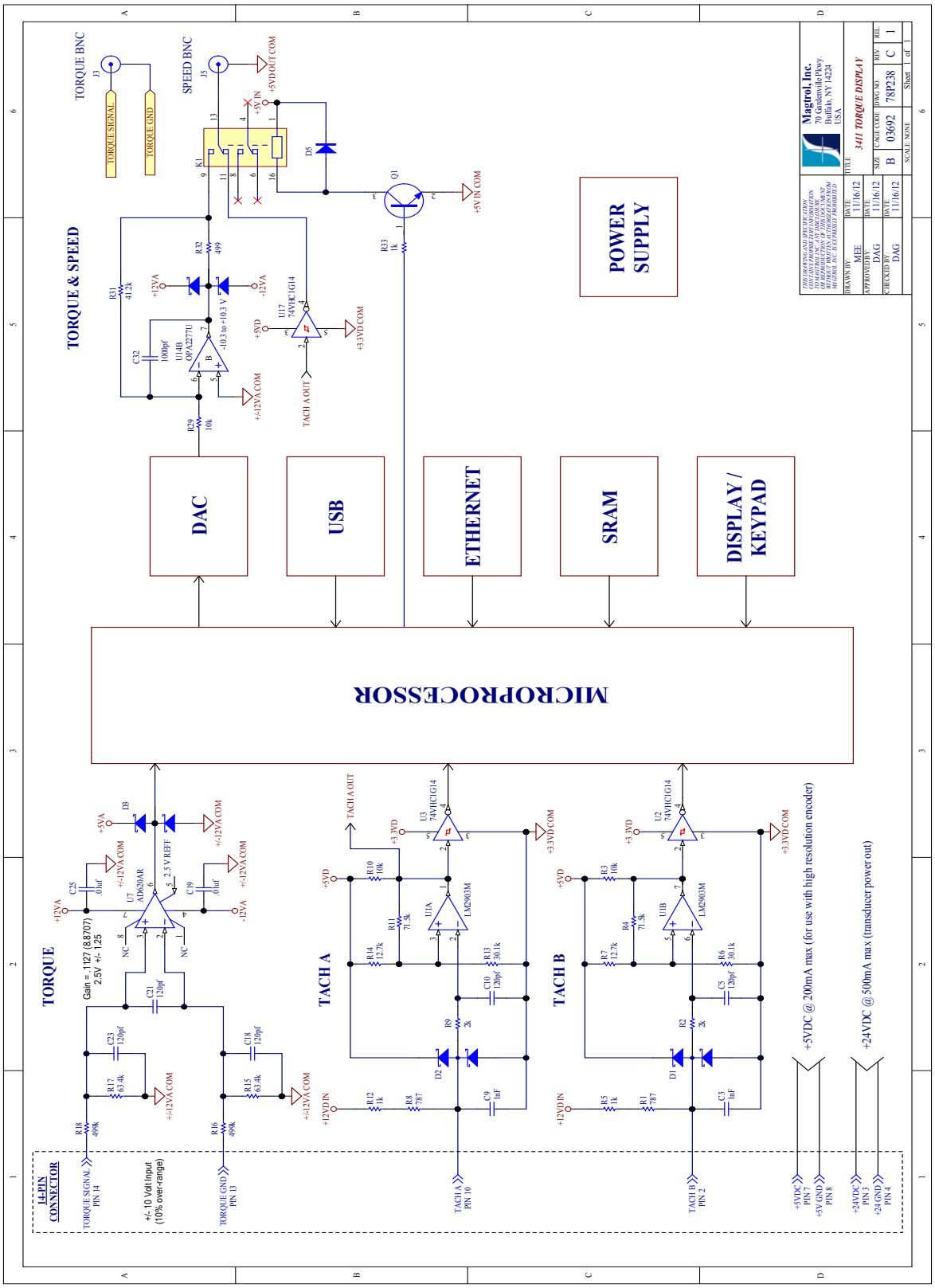
9. Troubleshooting

Problem	Reason	Solution
Returned data indicates COMMAND ERROR.	Command does not match the unit's programmed set of instructions.	Use correct command and format.
Mechanical power reads much higher or lower than expected.	Torque units or scale factor is incorrect.	Set torque input units and scale factor to match the specifications of torque transducer.
No USB communication.	Setup error and/or hardware fault.	Check: • Baud rate • Cable attachment from Torque Display to USB interface port of computer

If you require additional assistance, please contact Magtrol Customer Service at 1-716-668-5555.

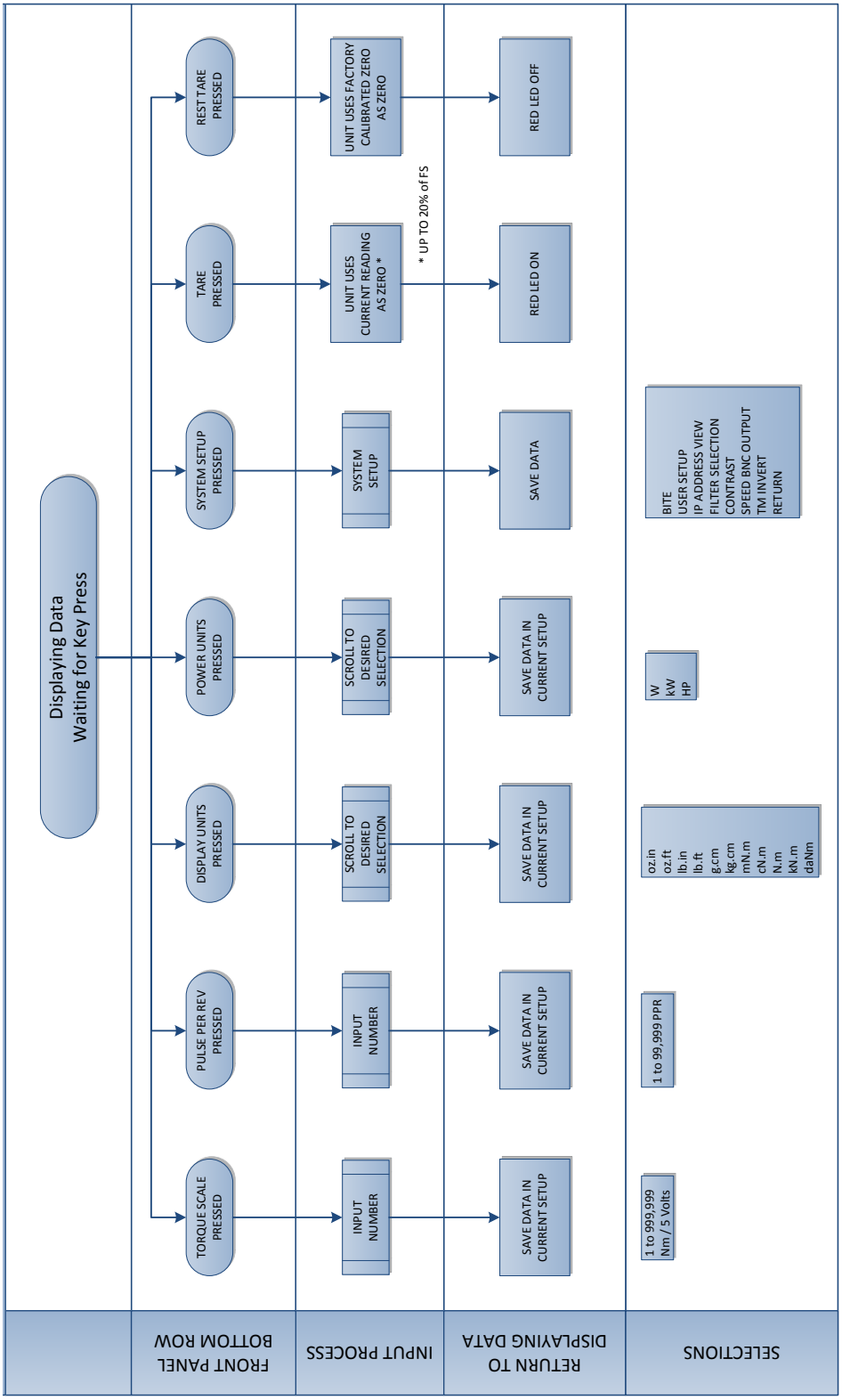
Appendix A: Schematics

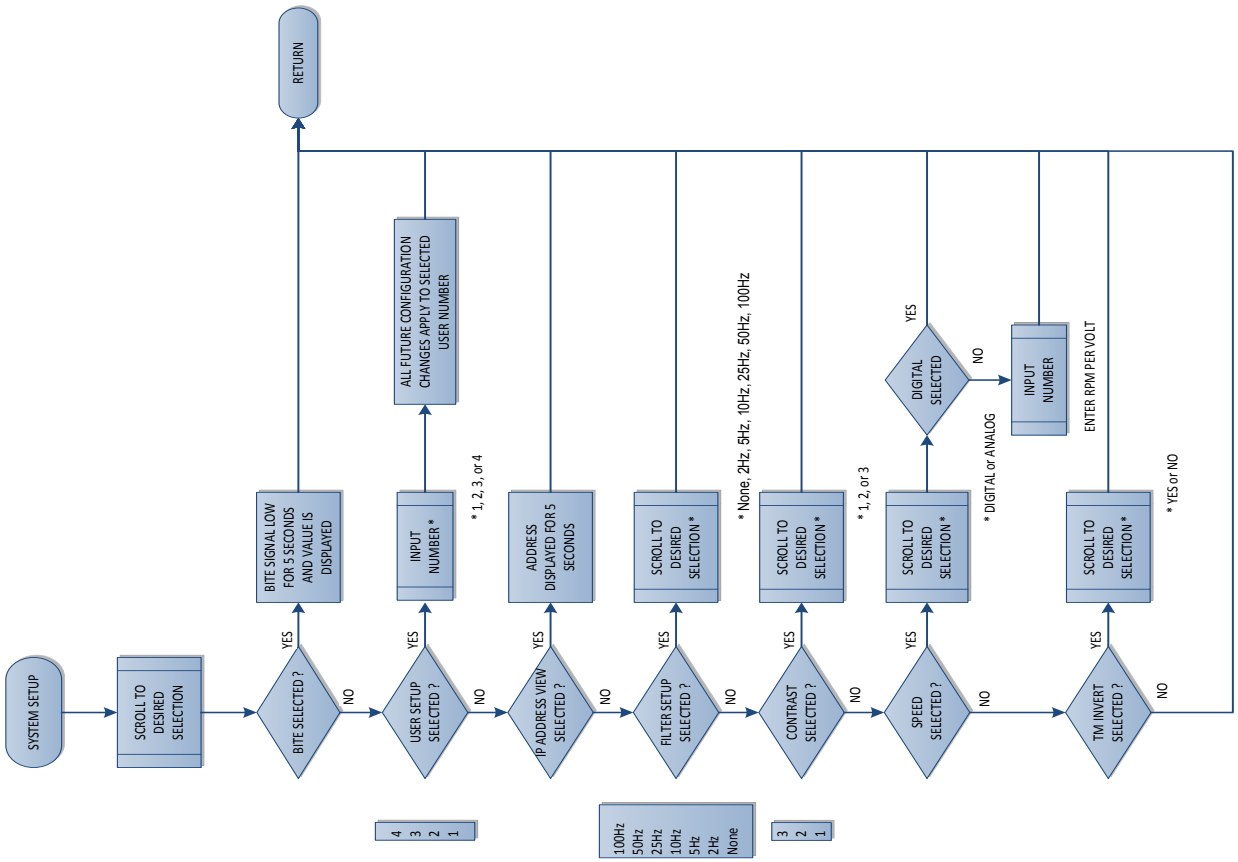
A.1 3411 SCHEMATIC

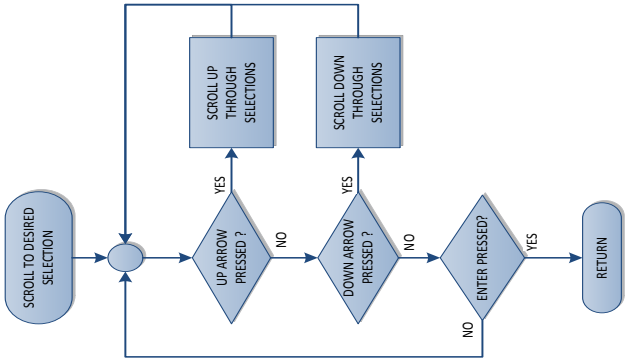


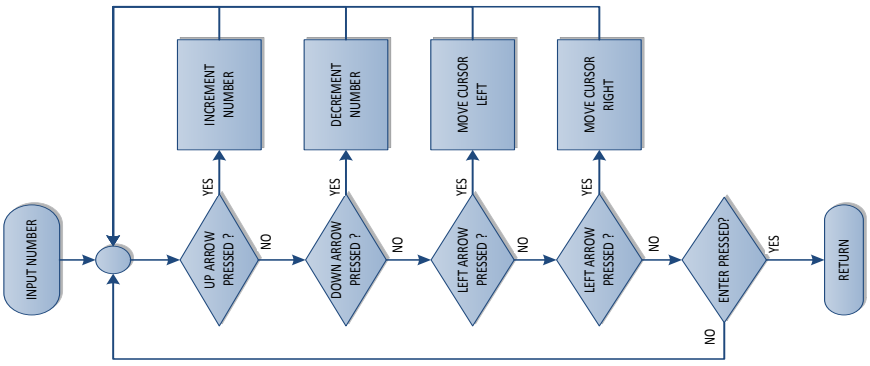
Appendix B: Menu Structure

B.1 3411 MENU STRUCTURE




SYSTEM SETUP
SCROLL TO DESIRED SELECTION
BITE SELECTED ?
BITE SIGNAL LOW FOR 5 SECONDS AND VALUE IS DISPLAYED
USER SETUP SELECTED ?
INPUT NUMBER *
* 1, 2, 3, or 4
ALL FUTURE CONFIGURATION CHANGES APPLY TO SELECTED USER NUMBER
IP ADDRESS VIEW SELECTED ?
ADDRESS DISPLAYED FOR 5 SECONDS
FILTER SETUP SELECTED ?
SCROLL TO DESIRED SELECTION *
* None, 2Hz, 5Hz, 10Hz, 25Hz, 50Hz, 100Hz
CONTRAST SELECTED ?
* 1, 2, or 3
SPEED SELECTED ?
DIGITAL SELECTED
* DIGITAL or ANALOG
INPUT NUMBER
TM INVERT SELECTED ?
ENTER RPM PER VOLT
* YES or NO
RETURN
YES
NO
4 3 2 1
100Hz 50Hz 25Hz 10Hz 5Hz 2Hz None
3 2 1


SCROLL TO DESIRED SELECTION
UP ARROW PRESSED ?
SCROLL UP THROUGH SELECTIONS
DOWN ARROW PRESSED ?
SCROLL DOWN THROUGH SELECTIONS
ENTER PRESSED?
RETURN
YES
NO


INPUT NUMBER
UP ARROW PRESSED ?
INCREMENT NUMBER
DOWN ARROW PRESSED ?
DECREMENT NUMBER
LEFT ARROW PRESSED ?
MOVE CURSOR LEFT
LEFT ARROW PRESSED ?
MOVE CURSOR RIGHT
ENTER PRESSED?
RETURN
YES
NO

Appendix C: Computer Controlled Operation Prior to Firmware Version L

The 3411 Torque Display can be used with a personal computer for standard or custom torque and encoder setups. Using the 3411 with a computer enables the unit to perform at its full capacity.

C.1 ABOUT THE ETHERNET INTERFACE

Connect one side of the Ethernet cable to the 3411 RJ45 receptacle, and the other to a wall outlet, switch or router. Turn the power to the 3411 on; if already on, power cycle. Use the IP ADDRESS VIEW system setup option to discover the IP address assigned to your 3411. (Refer to section 4.1.5.4) Launch a web browser on your computer, and type this IP address into the address bar. The following authentication page will pop up. The default username is “admin” and the default password is to be left blank.

Figure C–1 Authentification Window

Once the porper credentials are entered, press the “OK” button. The 3411 home web page will then be displayed.

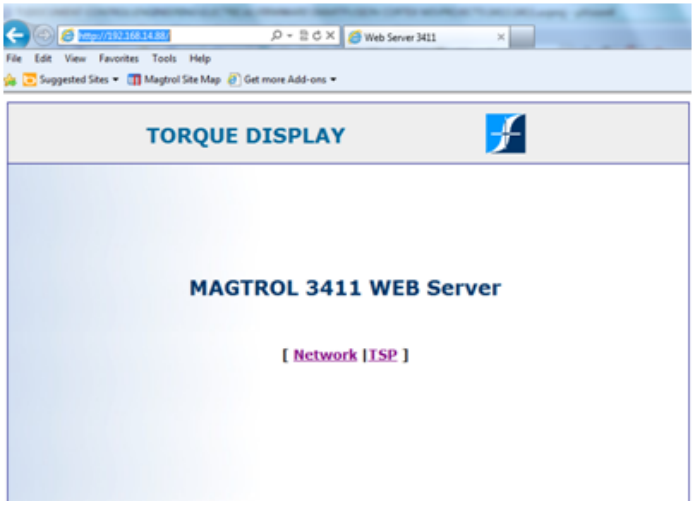


Figure C–2 Magtrol 3411 home web page

APPENDICES

Press “Network”to display the LAN settings.

Press  key, to return to the home web page.

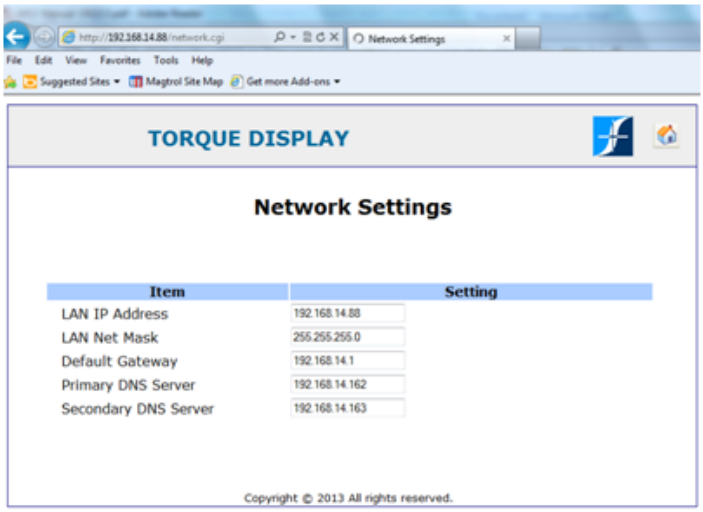


Figure C–3 Network Settings web page

In the home web page, press “TSP” to display the torque, speed and power web page. Select the “Periodic” check box so that power, torque, and speed values will refresh at 0.5 second intervals.

Press  key, it will return home web page.

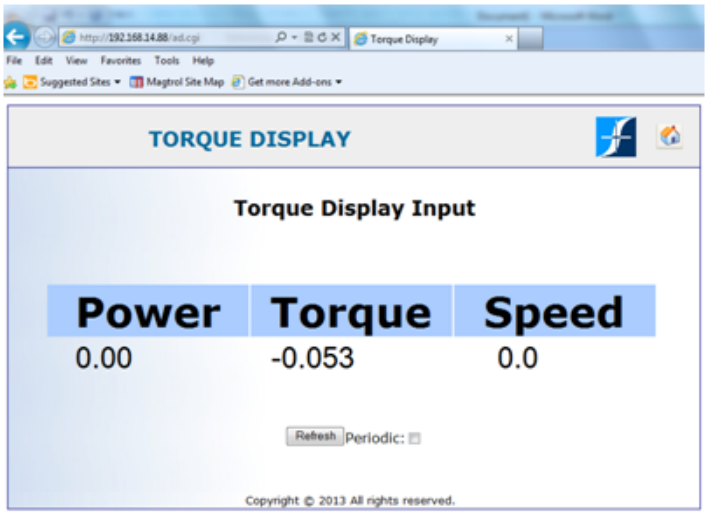


Figure C–4 Torque Display Input web page

NOTE: Background checking for Ethernet connection could last up to 1 minute after power on to obtain a DHCP IP address.

APPENDICES

NOTE: You must power cycle the 3411 to restart the DHCP IP address negotiation.

NOTE: Ethernet communication will be lost during key entry into front panel menus after 2 minutes.

C.2 ABOUT THE USB INTERFACE

To use the USB interface of the 3411, you must first install the drivers on your personal computer. Once the drivers are installed the 3411 will appear in the Windows device manager as a Virtual COM port.

C.2.1 USB DRIVER SETUP FOR WINDOWSXP/WINDOWS7 32BIT

Copy the 3411 USB driver files from the Torque 7 CD onto the local drive of your PC. The files are located in the *3411 DRIVER FOR WINDOWS*\ folder on the CD.

1. Run *CP210xVCPInstaller_x86.exe*.
2. Power on the 3411. The Found New Hardware Wizard window will pop up as shown below. On the Driver Installation window choose "Install from a list or specific location (Advanced)" option as shown in figure C–1 Driver Installation window.

Figure C–5 Driver Installation Window

3. Click the Next button. The following screen will display. Browse the location you selected when executing *CP210xVCPInstaller_x86.exe*.

APPENDICES

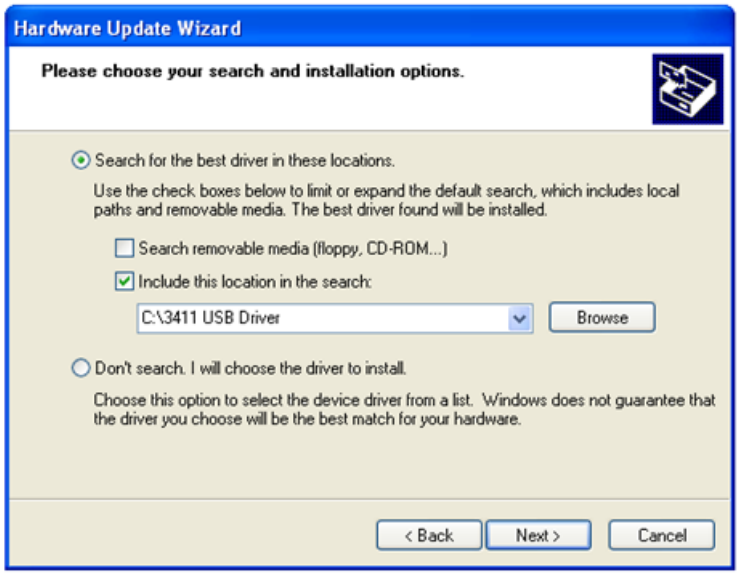


Figure C–6 Installation Options Window

4. Click the Next button. The following screen will display. The driver will be installed.

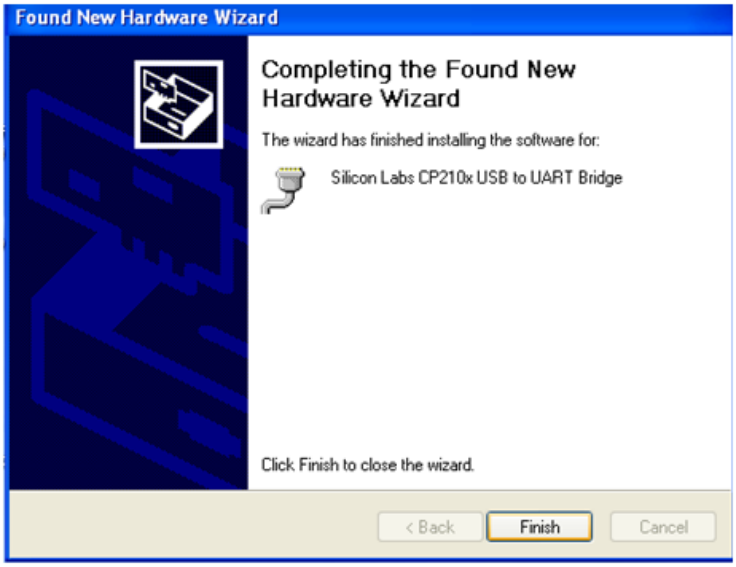


Figure C–7 Installation Finish Window

5. Click Finish button, “Found new hardware” will show in right corner. Then USB driver has been installed correctly.

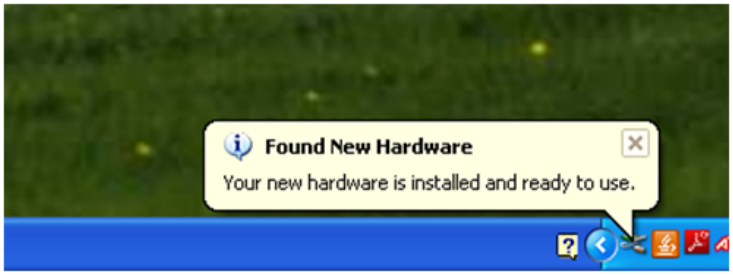


Figure C–8 Installation Complete Window

C.2.2 USB DRIVER SETUP FOR WINDOWS7/8 64BIT

Copy the 3411 USB driver files from the Magtrol Manual CD at *programs\3411USB Driver* directory into local drive of your PC.

1. Run *CP210xVCPInstaller_x64.exe*.
2. Power on the 3411. A window in the right corner will show "Installing device driver software" and then show "Magtrol 3411 CP210x USB to UART Bridge(COM#)".

C.2.3 SET UP USB COMMUNICATION

C.2.3.1 Communication Parameters

- No parity
- 8 data bits
- 1 stop bit
- No protocol

C.2.3.2 Baud Rate

The application in PC should set up baud rate 921600 in order to communicate with PC via USB.

Service Information

RETURNING MAGTROL EQUIPMENT FOR REPAIR AND/OR CALIBRATION

Before returning equipment to Magtrol for repair and/or calibration, please visit Magtrol's Web site at http://www.magtrol.com/support/rma.htm to begin the Return Material Authorization (RMA) process. Depending on where the equipment is located and which unit(s) will be returned, you will be directed to either ship your equipment back to Magtrol, Inc. in the United States or Magtrol SA in Switzerland.

Returning Equipment to Magtrol, Inc. (United States)

When returning equipment to Magtrol, Inc.'s factory in the United States for repair and/or calibration, a completed Return Material Authorization (RMA) form is required.

1. Visit Magtrol's Web site at http://www.magtrol.com/support/rma.htm to begin the RMA process.
2. Complete the RMA form online and submit.
3. An RMA number will be issued to you via e-mail. Include this number on all return documentation.
4. Ship your equipment to:
   MAGTROL, INC.
   70 Gardenville Parkway
   Buffalo, NY 14224
   Attn: Repair Department
5. After Magtrol's Repair Department receives and analyzes your equipment, a quotation listing all the necessary parts and labor costs, if any, will be faxed or e-mailed to you.
6. After receiving your repair estimate, provide Magtrol with a P.O. number as soon as possible. A purchase order confirming the cost quoted is required before your equipment can be returned.

Returning Equipment to Magtrol SA (Switzerland)

If you are directed to ship your equipment to Switzerland, no RMA form/number is required. Just send your equipment directly to Magtrol SA in Switzerland and follow these shipment instructions:

1. Ship your equipment to:
   MAGTROL SA
   After Sales Service
   Route de Montena 77
   1728 Rossens / Fribourg
   Switzerland
   VAT No: 485 572
2. Please use our forwarder : TNT • 1-800-558-5555 • Account No 154033
   Only ship ECONOMIC way (3 days max. within Europe)
3. Include the following documents with your equipment:
   - Delivery note with Magtrol SA's address (as listed above)
   - Three pro forma invoices with:
     - Your VAT number
     - Description of returned goods
     - Noticed failures
     - Value - for customs purposes only
     - Origin of the goods (in general, Switzerland)
4. A cost estimate for repair will be sent to you as soon as the goods have been analyzed. If the repair charges do not exceed 25% the price of a new unit, the repair or calibration will be completed without requiring prior customer authorization.

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