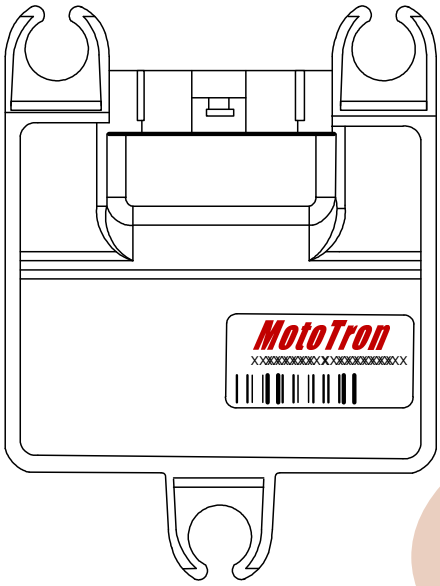
MotoTron MotoHawk

Engineering Specification	**ECM-0S12-024-0503-F** **Data Sheet**	Date: 6/19/07 Revision: 1.2 Author: MGM

ECM-0S12-024-0503-F
Electronic Control Module



Summary

The ECM-0S12-024-0503 -F electronic control module is a rugged embedded control system capable operating in harsh automotive, marine, and off-highway applications. Hundreds of successful industrial applications prove the capability of this module. Based on a proven microprocessor, the ECM-0S12-024-0503is capable of delivering complex control strategies. A CAN 2.0B datalink ensures interoperability with other vehicle systems.
The ECM-0S12-024-0503 -F is compatible with the ControlCore embedded software framework.

Microprocessor: Motorola MC9S12DT128, 24MHz
Memory: (MC9S12DT128BMPV) 128 K Flash, 8K RAM
8Kx8 Serial EEPROM (ECM-0S12-024-0503-C)
Operating Voltage: 8-20VDC
Operating Temperature: -40 to 105 C

Sealed Connectors Operable to 10ft submerged

Inputs:
- 10 Analog Inputs
- 1 VR Frequency Input

Outputs:
- 5 10A Low Side PWM
- 1 1.0A Low Side PWM

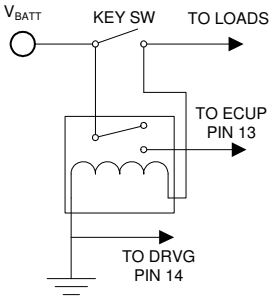
Datalinks:
- 1 CAN 2.0B Channel

SIZE: **A**	CAGE CODE: **3HDS6**	TITLE: **ECM-0S12-024-0503-F Electronic Control Module**	**COPYRIGHT 2006**
SCALE: NONE	DWG. NO.:	SHEET: **1 of 8**	REV: **1.2**

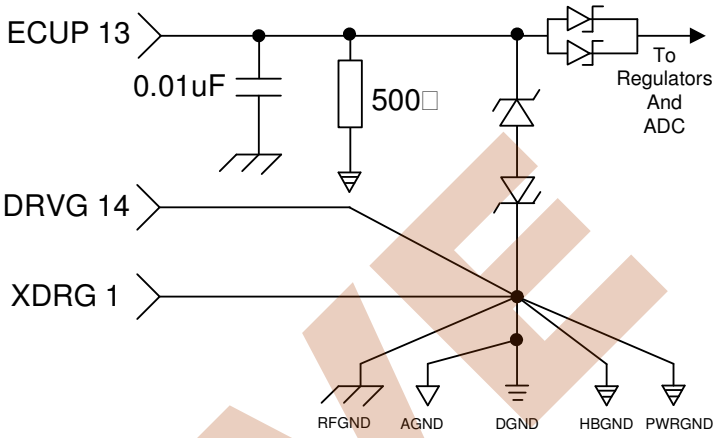
1 INPUT SIGNAL CONDITIONING

1.1 ECUP/AN1M (13), DRVG (14), XDRG (1)

Power (Key) switch input ECUP supplies module power. Input is monitored by the processor.

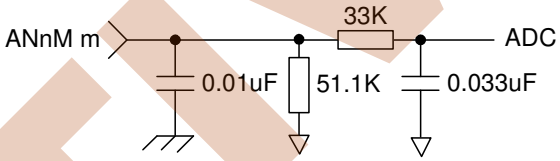


E-Stop switches are placed between the NO contact and pin 13 of the module. The XDRG is the transducer ground return.



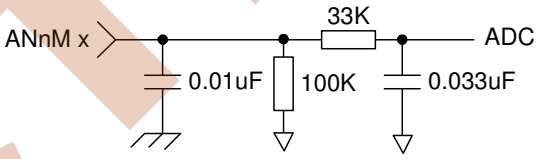
1.2 AN3M, AN4M, AN9M (5, 17, 2)

These inputs are 10bit 0-5V ADC, τ=1mS.



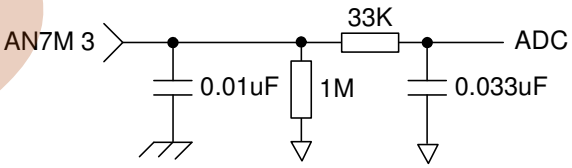
1.3 AN5M, AN6M, AN8M (4, 16, 15)

These inputs are 10bit 0-5V ADC, τ=1mS.



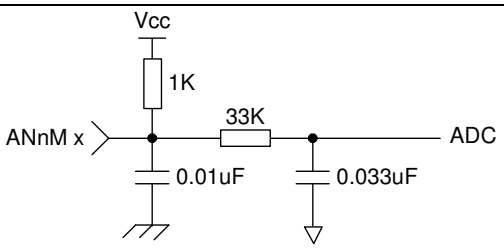
1.4 AN7M (3)

This input is a 10bit 0-5V ADC, τ=1mS.



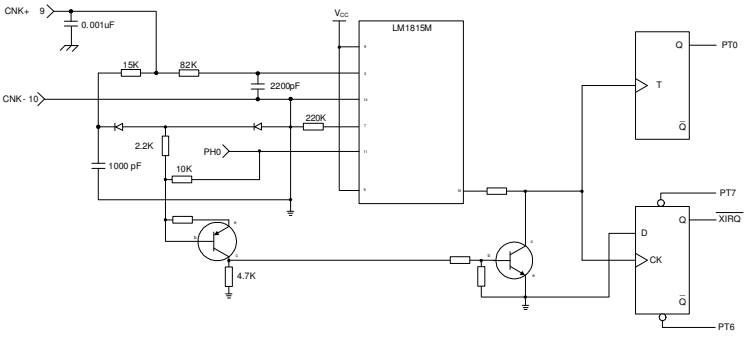
1.5 AN10M, AN11M, AN12M (7, 20, 8)

These inputs are 10bit 0-5V ADC, τ=1mS.



1.6 CNK+/CNK_DG, CNK- (9, 10)

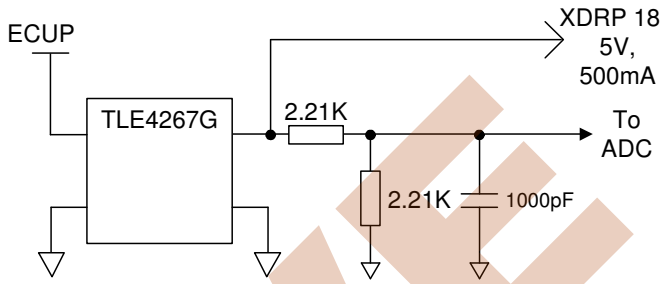
CNK+ and CNK- are variable reluctance sensor inputs.
CNK_DG is a switch input for a Hall Effect sensor. Only one should be wired in at a time.



2 OUTPUT SIGNAL CONDITIONING

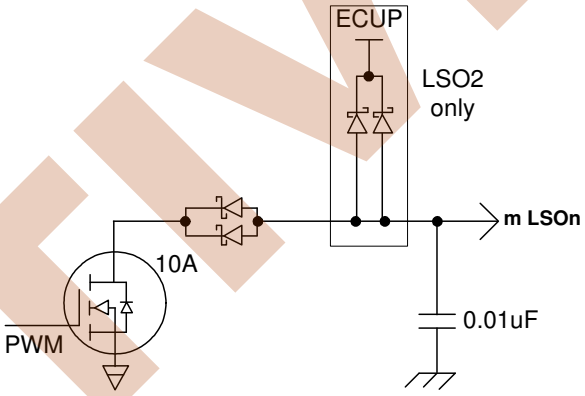
2.1 XDRP/AN2M (18)

This pin is the transducer power source. It is monitored by the processor.



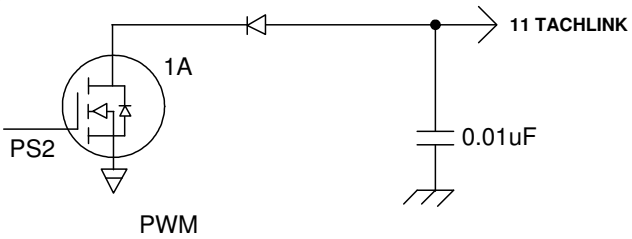
2.2 LSO1, …, LSO5 (12, 21, 23, 24, 22)

These outputs are high current sink drivers. 20V, 10A max. LSO2 includes the freewheeling diodes to ECUP

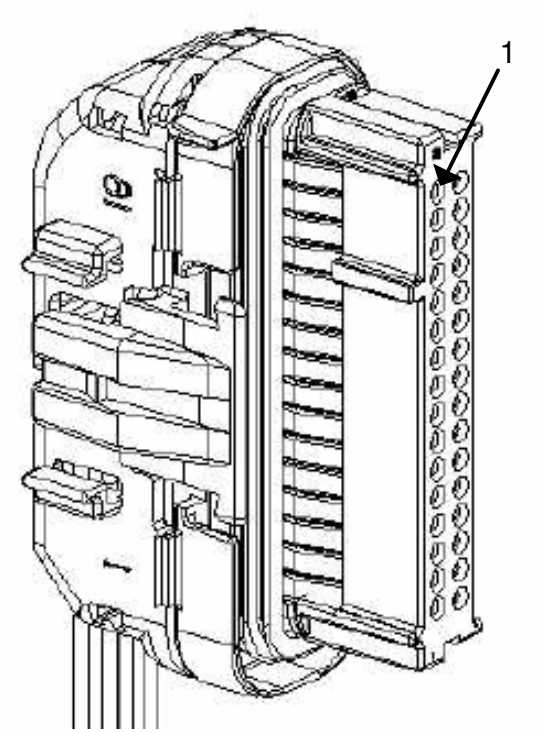


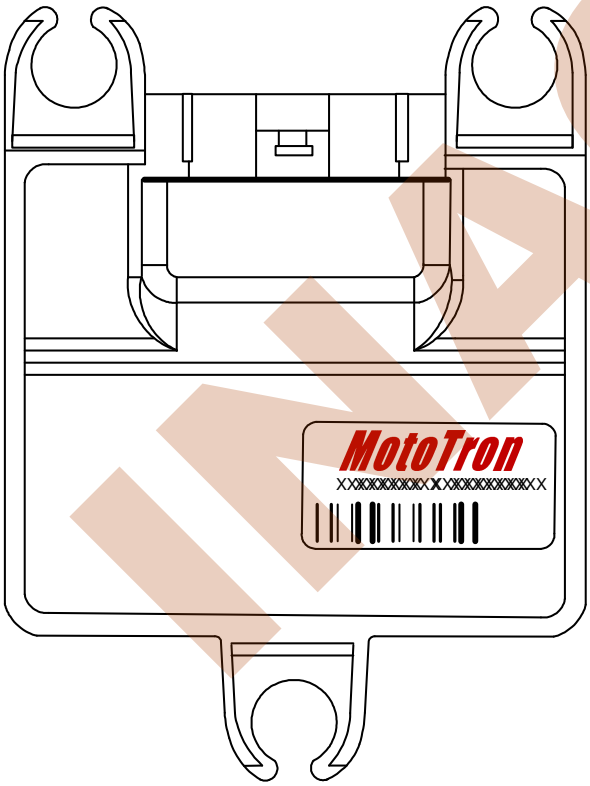
2.3 LSO6 (11)

This output is capable of sinking 1A max.

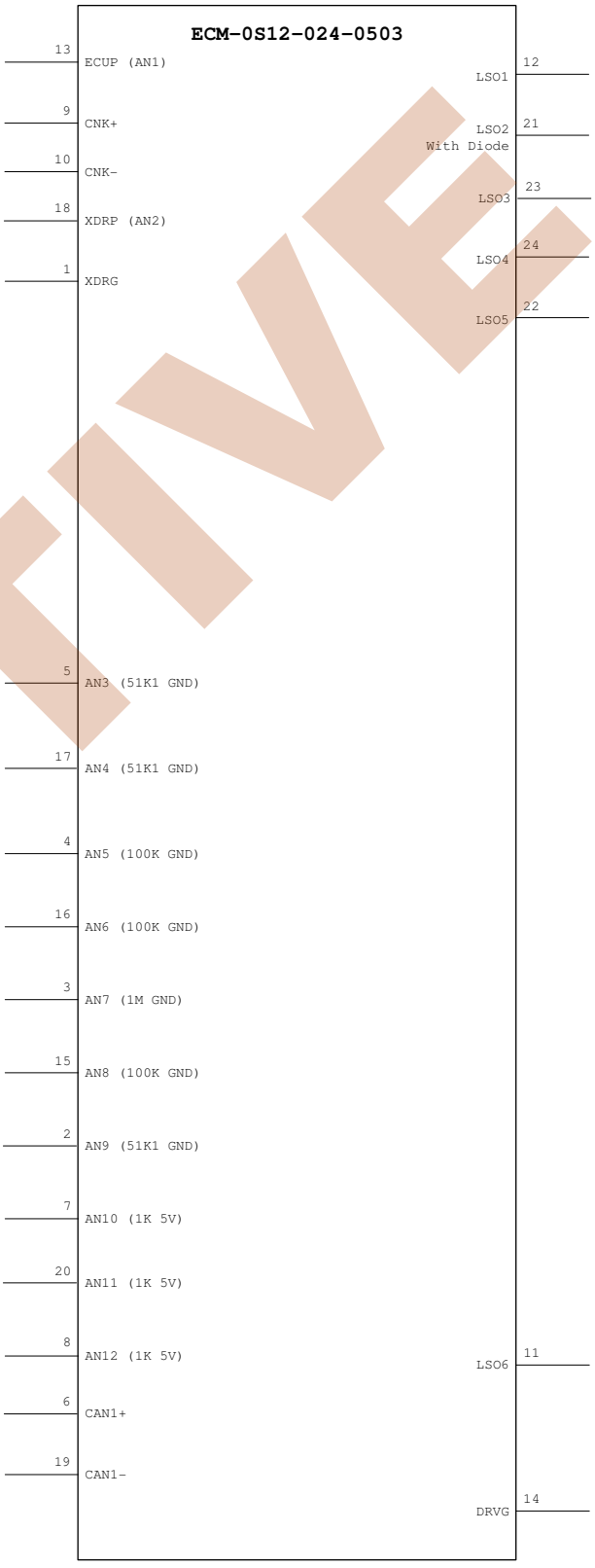


3 CONNECTOR DEFINITIONS





3.1 Block Diagram

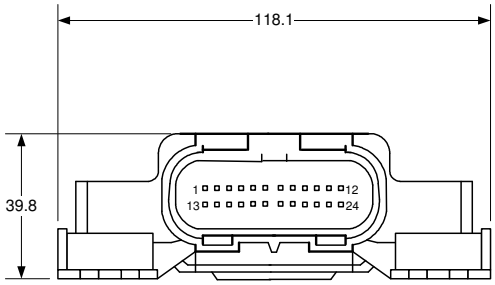


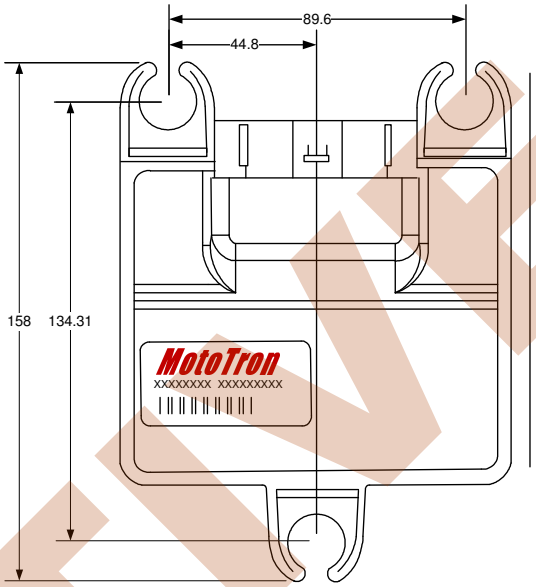
3.2 Connector Pinouts			
3.2.1 Resource by Connector Pin			
Pin #	**ControlCore**	**Function**	**Notes**
ECM	**Resource Name**	**Name**	
1	XDRG	Transducer Ground	Ground
2	AN9	Analog Input	220K Pull Down
3	AN7	Analog Input	1M Pull Down
4	AN5	Analog Input	100K Pull Down
5	AN3	Analog Input	51K Pull Down
6	CAN+	CAN	Terminating Resistance Required
7	AN10	Analog Input	1K Pull Up
8	AN12	Analog Input	1K Pull Up
9	CNK+/ CNK_DG	Crank Position HI/Hall Effect Crank Sensor	Variable Reluctance Sensor Compatible with NSC LM1815 or Hall Effect sensor
10	CNK-	Crank Position LO	
11	LSO6	Low Side Driver	1A Max.
12	LSO1	Low Side Driver	10A Max.
13	ECUP/AN1	Module Power	Power to Module (via Key Switch)
14	DRVG	Power Ground	Connect to Battery Ground
15	AN8	Analog Input	100K Pull Down
16	AN6	Analog Input	100K Pull Down
17	AN4	Analog Input	220K Pull Down
18	XDRP/AN2	Transducer Power	5V, 500mA
19	CAN-	CAN	Terminating Resistance Required
20	AN11	Analog Input	1K Pull Up
21	LSO2	Low Side Driver	10A Max.
22	LSO5	Low Side Driver	10A Max.
23	LSO3	Low Side Driver	10A Max.
24	LSO4	Low Side Driver	10A Max.

3.2.2 Resource by Name			
ControlCore	**Function**	**Notes**	**Pin #**
Resource Name	**Name**		**ECM**
AN3	Analog Input	51K Pull Down	5
AN4	Analog Input	220K Pull Down	17
AN5	Analog Input	100K Pull Down	4
AN6	Analog Input	100K Pull Down	16
AN7	Analog Input	1M Pull Down	3
AN8	Analog Input	100K Pull Down	15
AN9	Analog Input	220K Pull Down	2
AN10	Analog Input	1K Pull Up	7
AN11	Analog Input	1K Pull Up	20
AN12	Analog Input	1K Pull Up	8
CAN-	CAN	Terminating Resistance Required	19
CAN+			6
CNK-	Crank Position LO	"Variable Reluctance Sensor Compatible with NSC LM1815 or Hall Effect sensor	10
CNK+/ CNK_DG	"Crank Position HI/Hall Effect Crank Sensor		9
DRVG	Power Ground	Connect to Battery Ground	14
ECUP/AN1	Module Power	Power to Module (via Key Switch)	13
LSO1	Low Side Driver	10A Max.	12
LSO2	Low Side Driver	10A Max.	21
LSO3	Low Side Driver	10A Max.	23
LSO4	Low Side Driver	10A Max.	24
LSO5	Low Side Driver	10A Max.	22
LSO6	Low Side Driver	1A Max.	11
XDRG	Transducer Ground	Ground	1
XDRP/AN2	Transducer Power	5V, 500mA	18

4 PHYSICAL DIMENSIONS

4.1 All dimensions are in millimeters





5 ENVIRONMENTAL

5.1 Multi-Environment Stress Test

The module will normally be mounted to an engine via isolation bushings or a vibration isolated mounting plate. The normal operating environment includes high vibration, high temperature, and high humidity. Electrical noise (conducted and radiated) is also prevalent.

This document does not define the exact environmental characteristics of any specific application. Nor can it specify the exact environmental characteristics of any future application. This document does describe a series of validation tests that window anticipated application requirements.

The tests described in this document mirror the tests in the validation test plan. In the event of conflicting test requirements, the validation test plan takes precedence over this document.

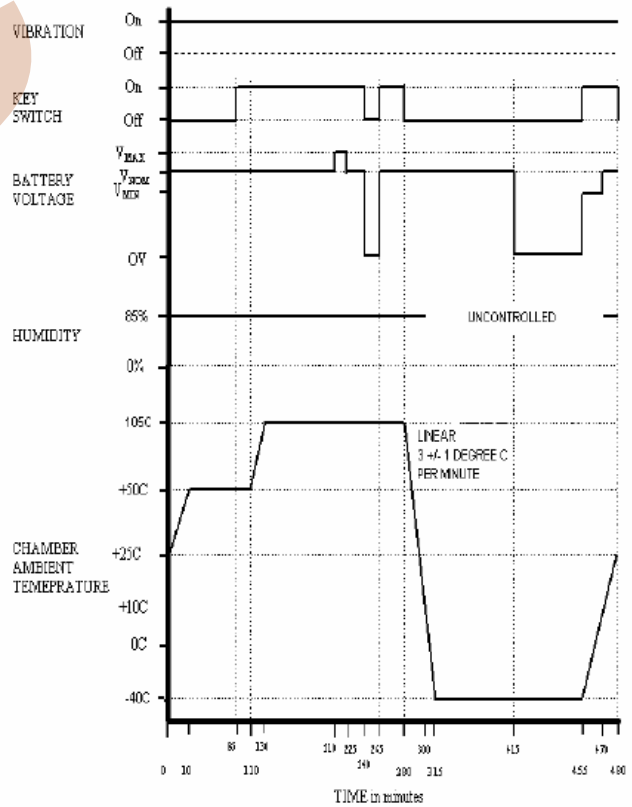
Notes

A. Vibration. The vibration levels specified in these tests are not engine or application vibration levels. They are accelerated levels derived from windowed data taken from multiple engines and then accelerated based on mission time and test time.

B. Temperature. The module shall be designed with automotive grade internal components (-40 to 125 C or better) and have an external ambient air operating temperature of -40 to +105 degrees C. Convective air flow may be assumed and most applications will have additional air flow while the engine is running. However, maximum allowable ambient temperature shall be based on internal power dissipation, airflow, and hot-soak characteristics. All of these factors are application dependent and some applications may not be capable of 105 C operation.

C. It is the responsibility of the application engineer to assure that the application does not exceed the demonstrated capabilities of the module; vibration or thermal. It may be necessary for the application engineer to perform additional testing in order to validate the module in the application.

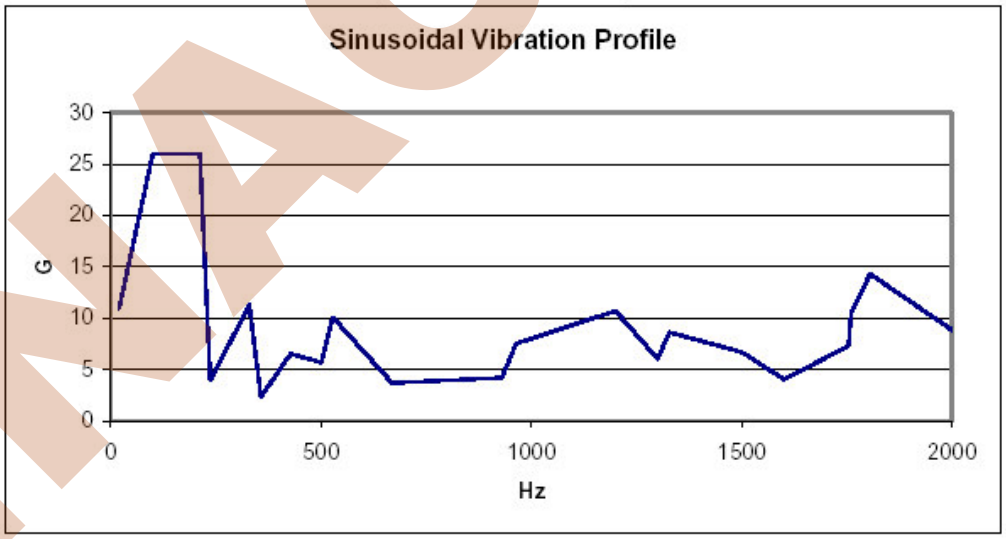
The MEST shall run for 240 hours (8 cycles of the MEST profile). When powered, the module shall operate in "Life Test Mode" using Factory Test software and any faults shall be logged to the test equipment.



5.2 Sinusoidal Vibration

The sinusoidal vibration test shall run for 24 hours each axis at ambient temperatures. The module shall operate in "Life Test Mode" using Factory Test software and any faults shall be logged to the test equipment.

HZ	G'S
20	10.96
100	26
153	26
212	26
237	3.93
330	11.31
357	2.34
428	6.53
501	5.7
528	10.08
669	3.7
930	4.18
964	7.53
1200	10.71
1300	6.05
1328	8.62
1500	6.69
1600	4.03
1754	7.28
1760	10.46
1805	14.31
2000	8.85



6. Ordering Information

MotoTron Sales: 734-822-7700