

VME Intensity Monitor - Task #14446

New scale factors for PXIE Ring Pickups 1 & 2

11/08/2016 02:58 PM - John Diamond

Status:	Work in progress	Start date:	11/08/2016
Priority:	Normal	Due date:	
Assignee:	John Diamond	% Done:	90%
Category:	MPS	Estimated time:	3.00 hours
Target version:		Spent time:	0.00 hour
Description			
New scale factors from Ning for Ring Pickups 1 & 2 that will require some code modification to support extra coefficients.			

History

#1 - 11/08/2016 02:59 PM - John Diamond

Scale factors from Ning:

PXIE Ring Pickup Scaling Factors - 11/3/2016

On front end code:

1. M01EPC (Average Current mA) and M01EPA (moving average of M01EPC):

$Current_Reading = C1 * (C3 ^ (C2 * RAW_CURRENT)) + C4$
Attention: Set D80 Scaling to 1.

2. M01EPI (Intensity E10):

$INT_Reading = C5 * Current_Reading * GW + C6$
Attention: Set D80 Scaling to 1.

3. Intensity Threshold Settings, common unit E10(?) (P:MPRLT , P:MPRUT):

$I_THR = (\log_base_C3(((Threshold_Setting - C6) / (GW * C5) - C4) / C1)) * GW / C2$
Attention: Set D80 Scaling to 1.

RAW_CURRENT: Raw Reading of "Intensity Reading Register" * GW

GW: Raw Reading of "Chopper Gate Width register"

I_THR: Register Value for (upper and lower) thresholds.

Threshold_Setting: D80 Setting for Upper and Lower Thresholds

For M01EPC, M01EPA, M01EPI, MPRLT, MPRUT:

C1 = -0.83655
C2 = 0.0003773625
C3 = 1.7
C4 = 0.092139
C5 = 0.004997418
C6 = 1.445763

For M02EPC, M02EPA, M02EPI, (Lower Threshold Device Name?), (Upper Threshold Device Name?):

C1 = -0.939618
C2 = 0.0003773625
C3 = 1.7
C4 = 0.139714
C5 = 0.049947
C6 = 2.042

#2 - 11/08/2016 03:00 PM - John Diamond

- Status changed from New to Work in progress

- % Done changed from 0 to 90

Done & ready for testing out at PXIE.

#3 - 11/10/2016 11:14 AM - John Diamond

PXIE actually wanted the ring pickup thresholds scaled to current, not intensity. Ning came up with new formulas for doing the scaling and revised the scaling factors -

PXIE Ring Pickup Scaling Factors - 11/3/2016

On front end code:

1. M01EPC (Average Current mA) and M01EPA (moving average of M01EPC):

$$\text{Current_Reading} = C1 * (C3 ^ (C2 * \text{RAW_CURRENT})) + C4$$

Attention: Set D80 Scaling to 1.

2. M01EPI (Intensity E10):

$$\text{INT_Reading} = C5 * \text{Current_Reading} * \text{GW} + C6$$

Attention: Set D80 Scaling to 1.

3. Intensity Threshold Settings, common unit E10 (P:MPRLT , P:MPRUT):

$$\text{I_THR} = (\log_base_C3((\text{Threshold_Setting} - C6) / (\text{GW} * C5) - C4) / C1) * \text{GW} / C2$$

Attention: Set D80 Scaling to 1.

3a. Current Threshold Settings, common unit mA (assign P:MPRLT , P:MPRUT to use this):

$$\text{C_THR} = \log_base_C3((\text{Current_Reading} - C4) / C1) * \text{GW} / C2$$

Attention: Set D80 Scaling to 1.

RAW_CURRENT: Raw Reading of "Intensity Reading Register" * GW

GW: Raw Reading of "Chopper Gate Width register"

I_THR: Register Value for (upper and lower) thresholds.

C_THR: Register Value for (upper and lower) Current thresholds.

Threshold_Setting: D80 Setting for Upper and Lower Thresholds

For M01EPC, M01EPA, M01EPI, MPRLT, MPRUT:

$$C1 = -0.83655$$

$$C2 = 0.0003773625$$

$$C3 = 1.7$$

$$C4 = 0.092139$$

$$C5 = 0.004997418$$

$$C6 = 1.445763$$

For M02EPC, M02EPA, M02EPI, MPR2LT, MPR2UT:

$$C1 = -0.939618$$

$$C2 = 0.0003773625$$

$$C3 = 1.7$$

$$C4 = 0.139714$$

$$C5 = 0.049947$$

$$C6 = 2.042$$