GE Power Management Control System

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Technical Note #11

Automatic WFC & WFR on EPM3720

Subject: Using a setpoint to trigger a waveform capture or record on the EPM3720.

Applies To: PMCS Waveform Capture and EPM3720.

When a Setpoint is programmed from the MMI, the EPM3720 has the ability to automatically capture or record waveforms based on the value of a specified parameter. In order to display a Waveform Capture, the meter takes 128 samples from a full cycle of any single selected channel. For a Waveform Record, the meter takes 16 samples per cycle from multiple cycles on all 8 inputs simultaneously. The device will store 36 cycles of 1 event, 18 cycles of 2 events, or 12 cycles of 3 events, depending on the Record Depth programmed by the user. Please follow the instructions below to use a Setpoint to trigger a waveform capture or record on the EPM3720.

Instructions for EPM3720 Automatic Waveform Capture and Record

1. In the EPM3720 MMI tabular screen, click on the Setpoints tab.
2. Choose an unassigned setpoint number. Either Standard or High Speed may be used, but High Speed is recommended for quicker response. (See Section 6 of the 3720 ACM Installation & Operation Manual for more details on configuring Setpoints.)
3. Based on the parameter that will be set in the Trigger Key, select the Setpoint Type.
4. Set the Trigger Key. The Trigger Key is a code for the parameter that, when its value passes a set limit, triggers an Action. Reference the document "trigger.doc" in Appendix A for a list of Trigger Key codes.
5. Enter the High and Low Limits as well as any Time Delays to operate and release.
6. Select the required Action. To record a waveform, choose "Waveform Recorder". For Waveform Capture, remember that the waveform of only one input may be automatically captured. Choose "Waveform Capture Channel X" where X represents an integer between 1 and 8. Following are the Channel assignments for Wye and Delta systems.

Wye	Delta
Channel 1: V1-N Channel 2: I1 Channel 3: V2-N Channel 4: I2 Channel 5: V3-N Channel 6: I3 Channel 7: I4 Channel 8: Vaux	Channel 1: V1-2 Channel 2: I1 Channel 3: N/A Channel 4: I2 Channel 5: V3-1 Channel 6: I3 Channel 7: I4 Channel 8: Vaux

7. Press the "Download" key. This will transmit the values entered into the Setpoints tabular screen for the selected setpoint number to the device. After several seconds press the"Refresh" button and scroll to the selected setpoint to verify that the device has accepted the setpoint entered parameters.

8. For waveform record, open the Waveform Capture program from within the MMI. On the main screen, select the appropriate Topic or device name and click on the "Record" radio button. Then, under the menu path "Waveform", "Configure", and "Record Depth", select a depth of either 1 event x 36 cycles, 2 events x 18 cycles, or 3 events x 12 cycles. Press OK. The "Trigger", "Arm", & "Retrieve" buttons will become inactive as the depth is downloaded to the meter. For waveform capture proceed directly to step 9.

9. Once the "Trigger", "Arm", & "Retrieve" buttons become active, press the "Arm" button. The "Trigger", "Arm", & "Retrieve" buttons will momentarily become inactive. When the buttons become active, the meter is now ready to record/capture a waveform when the setpoint conditions are reached.

10. Once the waveform has been automatically captured or recorded and the event has been logged, choose the appropriate Topic and function (i.e.in the main screen of the Waveform Capture program and press "Retrieve".

11. View and save waveforms as desired.

12. To rearm the meter and clear the waveform data out of the device’s memory, press "Arm" on the main screen of the Waveform Capture program.

Trigger Key Thumbwheel Setting

Key #1	Key #2	Key #3 & #4	Meaning
Class	**Sub-class**	**Instance**	**Meaning**
0	0	00	Null Object Identifier
1	0	00-05	Digital Inputs (Status Inputs)
1	1	00-02	Digital Outputs (Relays)
1	2	00-07	Analog Inputs (Voltage & Current Inputs)
1	3	00	Analog Outputs (IOUT)
1	4	00-05	Digital Inputs (Status Inputs) -- Status
1	5	00-02	Digital Outputs (Relays) -- Status
1	8	00-05	Digital Inputs (Status Inputs) -- Counter
1	9	00-02	Digital Outputs (Relays) -- Counter
1	C	00-05	Digital Inputs (Status Inputs) -- Preset/Reset

1	D	00-02	Digital Outputs (Relays) -- Reset
1	E	00-03	Digital Inputs (Status Inputs) -- Scale
1	F	00-03	Digital Inputs (Status Inputs) -- Rollover
4	0	see valid instances below	High-speed Present (for high speed waveform capture)
4	1	see valid instances below	Standard Present
4	2	see valid instances below	Thermal Demand Present
4	3	see valid instances below	Sliding Window Demand Present
4	4	see valid instances below	High-speed Minimum
4	5	see valid instances below	Standard Minimum
4	6	see valid instances below	Thermal Demand Minimum
4	7	see valid instances below	Sliding Window Demand Minimum
4	8	see valid instances below	High-speed Maximum
4	9	see valid instances below	Standard Maximum
4	A	see valid instances below	Thermal Demand Maximum
4	B	see valid instances below	Sliding Window Demand Maximum
#1	**#2**	**#3 & #4**	**Trigger Key Thumbwheel Setting**
4	C	see valid instances below	Hours - Net (Import - Export)
4	D	see valid instances below	Hours - Import
4	E	see valid instances below	Hours - Export
4	F	see valid instances below	Hours - Total (Import + Export)

Valid instances(Used when Key#1 and #2 are equal from "40" to "4F")

		Instance	Measurement	Supported Modes
		00	Volts LN Average	HS STD TD SD PD
		01	Volts LN Phase A	HS STD TD SD PD
		02	Volts LN Phase B	HS STD TD SD PD
		03	Volts LN Phase C	HS STD TD SD PD
		04	Volts LL Average	HS STD TD SD PD
		05	Volts LL Phase AB	HS STD TD SD PD
		06	Volts LL Phase BC	HS STD TD SD PD
		07	Volts LL Phase CA	HS STD TD SD PD
		08	Amps Average	HS STD TD SD PD
		09	Amps Phase A	HS STD TD SD PD
		0A	Amps Phase B	HS STD TD SD PD
		0B	Amps Phase C	HS STD TD SD PD
		0C	Amps Neutral	HS STD TD SD PD
		0D	Reserved	
		0E	Volts Imbalance (0-100)	HS STD TD SD PD
		0F	Amps Imbalance (0-100)	STD TD SD PD
		10	kW Total	HS STD TD SD PD HRS
		11	kW Phase A	HS STD TD SD PD
		12	kW Phase B	HS STD TD SD PD
		13	kW Phase C	HS STD TD SD PD
		14	kVAR Total	STD TD SD PD HRS
		15	kVAR Phase A	STD TD SD PD
		16	kVAR Phase B	STD TD SD PD
		17	kVAR Phase C	STD TD SD PD
		18	kVA Total	HS STD TD SD PD HRS
		19	kVA Phase A	HS STD TD SD PD
		1A	kVA Phase B	HS STD TD SD PD
		1B	kVA Phase C	HS STD TD SD PD
		1C	PF Total	STD TD SD PD
		1D	PF Phase A	STD TD SD PD
		1E	PF Phase B	STD TD SD PD
		1F	PF Phase C	STD TD SD PD
		20	Frequency	HS STD TD SD PD
		21-23	Reserved	

		24	Phase Reversal (0 or 1)	HS STD
		25-27	Reserved	
		28	VAUX	STD TD SD PD
		29-2F	Reserved	
		30	I2T Avg. (0 = Off, 1= On)	HS
		31	I2T Phase A (0=Off, 1=On)	HS
		32	I2T Phase B (0=Off, 1=On)	HS
		33	I2T Phase C (0=Off, 1=On)	HS
		34-67	Reserved	
		68	V1 HD - K-Factor	STD TD SD PD
		69	V2 HD - K-Factor	STD TD SD PD
		6A	V3 HD - K-Factor	STD TD SD PD
		6B	VAUX HD - K-Factor	STD TD SD PD
		6C	I1 HD - K-Factor	STD TD SD PD
		6D	I2 HD - K-Factor	STD TD SD PD
		6E	I3 HD - K-Factor	STD TD SD PD
		6F	I4 HD - K-Factor	STD TD SD PD
		70	V1 HD - Total Odd	STD TD SD PD
		71	V2 HD - Total Odd	STD TD SD PD
		72	V3 HD - Total Odd	STD TD SD PD
		73	VAUX HD - Total Odd	STD TD SD PD
		74	I1 HD - Total Odd	STD TD SD PD
		75	I2 HD - Total Odd	STD TD SD PD
		76	I3 HD - Total Odd	STD TD SD PD
		77	I4 HD - Total Odd	STD TD SD PD
		78	V1 HD - Total Even	STD TD SD PD
		79	V2 HD - Total Even	STD TD SD PD
		7A	V3 HD - Total Even	STD TD SD PD
		7B	VAUX HD - Total Even	STD TD SD PD
		7C	I1 HD - Total Even	STD TD SD PD
		7D	I2 HD - Total Even	STD TD SD PD
		7E	I3 HD - Total Even	STD TD SD PD
		7F	I4 HD - Total Even	STD TD SD PD
		80	V1 HD - Total	STD TD SD PD
		81	V2 HD - Total	STD TD SD PD
		82	V3 HD - Total	STD TD SD PD
		83	VAUX HD - Total	STD TD SD PD
		84	I1 HD - Total	STD TD SD PD
		85	I2 HD - Total	STD TD SD PD

		86	I3 HD - Total	STD TD SD PD
		87	I4 HD - Total	STD TD SD PD
		88	V1 HD - Harmonic #1	STD TD SD PD
		89	V2 HD - Harmonic #1	STD TD SD PD
		8A	V3 HD - Harmonic #1	STD TD SD PD
		8B	VAUX HD - Harmonic #1	STD TD SD PD
		8C	I1 HD - Harmonic #1	STD TD SD PD
		8D	I2 HD - Harmonic #1	STD TD SD PD
		8E	I3 HD - Harmonic #1	STD TD SD PD
		8F	I4 HD - Harmonic #1	STD TD SD PD
		90	V1 HD - Harmonic #2	STD TD SD PD
		91	V2 HD - Harmonic #2	STD TD SD PD
		92	V3 HD - Harmonic #2	STD TD SD PD
		93	VAUX HD - Harmonic #2	STD TD SD PD
		94	I1 HD - Harmonic #2	STD TD SD PD
		95	I2 HD - Harmonic #2	STD TD SD PD
		96	I3 HD - Harmonic #2	STD TD SD PD
		97	I4 HD - Harmonic #2	STD TD SD PD
		98	V1 HD - Harmonic #3	STD TD SD PD
		99	V2 HD - Harmonic #3	STD TD SD PD
		9A	V3 HD - Harmonic #3	STD TD SD PD
		9B	VAUX HD - Harmonic #3	STD TD SD PD
		9C	I1 HD - Harmonic #3	STD TD SD PD
		9D	I2 HD - Harmonic #3	STD TD SD PD
		9E	I3 HD - Harmonic #3	STD TD SD PD
		9F	I4 HD - Harmonic #3	STD TD SD PD
		A0	V1 HD - Harmonic #4	STD TD SD PD
		A1	V2 HD - Harmonic #4	STD TD SD PD
		A2	V3 HD - Harmonic #4	STD TD SD PD
		A3	VAUX HD - Harmonic #4	STD TD SD PD
		A4	I1 HD - Harmonic #4	STD TD SD PD
		A5	I2 HD - Harmonic #4	STD TD SD PD
		A6	I3 HD - Harmonic #4	STD TD SD PD
		A7	I4 HD - Harmonic #4	STD TD SD PD
		A8	V1 HD - Harmonic #5	STD TD SD PD
		A9	V2 HD - Harmonic #5	STD TD SD PD
		AA	V3 HD - Harmonic #5	STD TD SD PD
		AB	VAUX HD - Harmonic #5	STD TD SD PD
		AC	I1 HD - Harmonic #5	STD TD SD PD

		AD	I2 HD - Harmonic #5	STD TD SD PD
		AE	I3 HD - Harmonic #5	STD TD SD PD
		AF	I4 HD - Harmonic #5	STD TD SD PD
		B0	V1 HD - Harmonic #6	STD TD SD PD
		B1	V2 HD - Harmonic #6	STD TD SD PD
		B2	V3 HD - Harmonic #6	STD TD SD PD
		B3	VAUX HD - Harmonic #6	STD TD SD PD
		B4	I1 HD - Harmonic #6	STD TD SD PD
		B5	I2 HD - Harmonic #6	STD TD SD PD
		B6	I3 HD - Harmonic #6	STD TD SD PD
		B7	I4 HD - Harmonic #6	STD TD SD PD
		B8	V1 HD - Harmonic #7	STD TD SD PD
		B9	V2 HD - Harmonic #7	STD TD SD PD
		BA	V3 HD - Harmonic #7	STD TD SD PD
		BB	VAUX HD - Harmonic #7	STD TD SD PD
		BC	I1 HD - Harmonic #7	STD TD SD PD
		BD	I2 HD - Harmonic #7	STD TD SD PD
		BE	I3 HD - Harmonic #7	STD TD SD PD
		BF	I4 HD - Harmonic #7	STD TD SD PD
		C0	V1 HD - Harmonic #8	STD TD SD PD
		C1	V2 HD - Harmonic #8	STD TD SD PD
		C2	V3 HD - Harmonic #8	STD TD SD PD
		C3	VAUX HD - Harmonic #8	STD TD SD PD
		C4	I1 HD - Harmonic #8	STD TD SD PD
		C5	I2 HD - Harmonic #8	STD TD SD PD
		C6	I3 HD - Harmonic #8	STD TD SD PD
		C7	I4 HD - Harmonic #8	STD TD SD PD
		C8	V1 HD - Harmonic #9	STD TD SD PD
		C9	V2 HD - Harmonic #9	STD TD SD PD
		CA	V3 HD - Harmonic #9	STD TD SD PD
		CB	VAUX HD - Harmonic #9	STD TD SD PD
		CC	I1 HD - Harmonic #9	STD TD SD PD
		CD	I2 HD - Harmonic #9	STD TD SD PD
		CE	I3 HD - Harmonic #9	STD TD SD PD
		CF	I4 HD - Harmonic #9	STD TD SD PD
		D0	V1 HD - Harmonic #10	STD TD SD PD
		D1	V2 HD - Harmonic #10	STD TD SD PD
		D2	V3 HD - Harmonic #10	STD TD SD PD
		D3	VAUX HD - Harmonic #10	STD TD SD PD

		D4	I1 HD - Harmonic #10	STD TD SD PD
		D5	I2 HD - Harmonic #10	STD TD SD PD
		D6	I3 HD - Harmonic #10	STD TD SD PD
		D7	I4 HD - Harmonic #10	STD TD SD PD
		D8	V1 HD - Harmonic #11	STD TD SD PD
		D9	V2 HD - Harmonic #11	STD TD SD PD
		DA	V3 HD - Harmonic #11	STD TD SD PD
		DB	VAUX HD - Harmonic #11	STD TD SD PD
		DC	I1 HD - Harmonic #11	STD TD SD PD
		DD	I2 HD - Harmonic #11	STD TD SD PD
		DE	I3 HD - Harmonic #11	STD TD SD PD
		DF	I4 HD - Harmonic #11	STD TD SD PD
		E0	V1 HD - Harmonic #12	STD TD SD PD
		E1	V2 HD - Harmonic #12	STD TD SD PD
		E2	V3 HD - Harmonic #12	STD TD SD PD
		E3	VAUX HD - Harmonic #12	STD TD SD PD
		E4	I1 HD - Harmonic #12	STD TD SD PD
		E5	I2 HD - Harmonic #12	STD TD SD PD
		E6	I3 HD - Harmonic #12	STD TD SD PD
		E7	I4 HD - Harmonic #12	STD TD SD PD
		E8	V1 HD - Harmonic #13	STD TD SD PD
		E9	V2 HD - Harmonic #13	STD TD SD PD
		EA	V3 HD - Harmonic #13	STD TD SD PD
		EB	VAUX HD - Harmonic #13	STD TD SD PD
		EC	I1 HD - Harmonic #13	STD TD SD PD
		ED	I2 HD - Harmonic #13	STD TD SD PD
		EE	I3 HD - Harmonic #13	STD TD SD PD
		EF	I4 HD - Harmonic #13	STD TD SD PD
		F0	V1 HD - Harmonic #14	STD TD SD PD
		F1	V2 HD - Harmonic #14	STD TD SD PD
		F2	V3 HD - Harmonic #14	STD TD SD PD
		F3	VAUX HD - Harmonic #14	STD TD SD PD
		F4	I1 HD - Harmonic #14	STD TD SD PD
		F5	I2 HD - Harmonic #14	STD TD SD PD
		F6	I3 HD - Harmonic #14	STD TD SD PD
		F7	I4 HD - Harmonic #14	STD TD SD PD
		F8	V1 HD - Harmonic #15	STD TD SD PD
		F9	V2 HD - Harmonic #15	STD TD SD PD
		FA	V3 HD - Harmonic #15	STD TD SD PD

		FB	VAUX HD - Harmonic #15	STD TD SD PD
		FC	I1 HD - Harmonic #15	STD TD SD PD
		FD	I2 HD - Harmonic #15	STD TD SD PD
		FE	I3 HD - Harmonic #15	STD TD SD PD
		FF	I4 HD - Harmonic #15	STD TD SD PD

Action Keys

The action keys specify the instance number for an object to perform an action on. The following action keys are possible:

Action Key	Setpoint Supported	Meaning
0	-	No action
1000-1004	STD HS	Clear digital input counter 0-3 (Status input counter 1-4), 4=ALL
1100-1102	STD HS	Operate Relay #1 to 3
1C00-1C04	STD HS	same as 1000-1004
A400-A407	STD HS	Waveform Capture channels #1 to 8
A500	STD HS	Waveform Recorder

Note: The EPM 3720 tabular wizard setup #2 tab there is no need to input an action key as a number. There is a drop down selection box which allows selection of an action by it's meaning.

Note: Action keys marked with STD are supported by Standard Setpoints (1-11), action keys marked with HS are supported by High Speed Setpoints (1-6).

Keywords

none

Related Notes

none

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