



Product Type: ASC/3

Reference: AN2112A

Date: 27 August 2009

ASC/3 HAWK Pedestrian Operation

Note: This application note, AN2112A, is revision “A” to AN2112. The only changes in this revision are on Pages 5 and 6:

In the Logic Processor Programming section:

- The wording of the testable and executable elements in LP 101 thru LP 104 was updated to ASC/3 software Version 2.45.00
- LP 105 was corrected.

Purpose

Program the ASC/3 logic processor to High-Intensity Activated Cross Walk (HAWK) pedestrian signal indication.

Introduction

To increase pedestrian safety at school crossing locations, the City of Tucson, AZ developed a traffic signal control application called the HAWK. The HAWK uses traditional traffic and pedestrian signal heads in a different configuration than is usually encountered. It includes a sign instructing motorists to “Stop on Red” and a “pedestrians” overhead sign. There is also a sign informing pedestrians on how to cross the street safely.

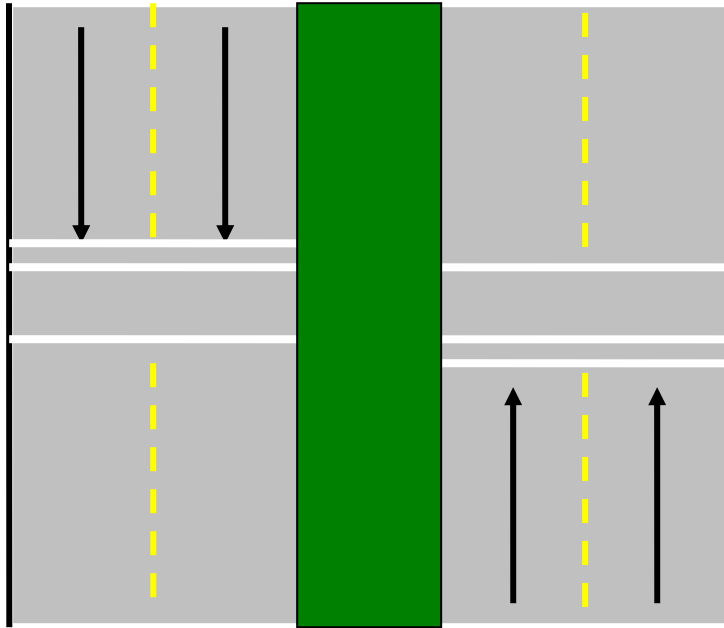
When not activated, the vehicle signal is blanked out. The HAWK signal is activated by a pedestrian push button. The overhead vehicle signal begins flashing yellow and then transitions to solid yellow, advising drivers to prepare to stop. The vehicle signal then displays a solid red and the pedestrian shows the pedestrian a “Walk” indication. Finally, after the walk signal expires, an alternating flashing red signal indicates that motorists may proceed when safe (after coming to a full stop), while simultaneously the pedestrian is shown a flashing “Don’t Walk” with a countdown indicating the time left to cross.



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Below is the basic intersection that will be used for this operation.



Typical Hawk Intersection Diagram



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The following diagram shows the traffic signal heads as well as the pedestrian signals.

	<p>Signal configuration: Veh. red = 1 & 5 red Veh. yellow = 2 & 6 yellow Ped = 4 & 8 ped.</p>	
	<p>No Ped call = vehicle blanked out Ped = don't walk</p>	
	<p>Ped call = vehicle flashing yellow then solid yellow Ped = don't walk</p>	
	<p>Vehicle signal = solid red Ped = walk</p>	
	<p>Vehicle signal = flashing red Ped = flashing don't walk with countdown</p>	

Vehicle and Pedestrian Signal Heads Seen at Intersection



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Normal operation:

The vehicle signals are dark and the pedestrian signals are displaying solid “Don’t Walk”. The signal will not cycle until the pedestrian pushbutton is actuated. Phases 2 and 6 are not visibly displayed to the intersection while the controller is in a Walk Hold condition. Once a call is received, the through vehicle signals begin flashing yellow. The flashing yellow is associated internally to the controller during the timing of Phase 2/6 Pedestrian Clearance. Once timed, Phases 2/6 will time the Yellow interval, displaying a solid yellow on the same vehicle signal head. When Phases 2/6 Yellow interval time is complete, the next interval will be Red Clear, which will display a solid Red output on the vehicle signal head. During this time the pedestrian signals have been displaying solid Don’t Walk.

Once the Phase 4 or 8 Walk cycle has timed out and Pedestrian Clearance interval begins, both Red vehicle signals will flash in an alternating fashion. This will continue through Red Clear interval until Phases 4 or 8 have completed timing.

Applications

Program the controller as follows:

MM-1-1-1 Program the phases sequence and ring assignments as follows:

```

CONTROLLER SEQUENCE [ 1 ] >
SEQUENCE COMMANDS . HW ALT SEQ ENA. NO
 01 02 03 04 05 06 07 08 09 10 11 12
BC-B B B - - - - -
R1-| 2| 4| . . . . .
R2-| 6| 8| . . . . .
R3-| 1| .| . . . . .
R4-| 5| .| . . . . .

R1-R4=RING 1-4, DATA ENTRY, PHASES 1-16
BC=BARRIER CONTROL, VALUES: B,C
B=BARRIER MODE
C=COMPATIBILITY MODE

```



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MM-1-2 Program the phases used as follows:

PHASES IN USE / EXCLUSIVE PED									
	PHASE	1	2	3	4	5	6	7	8
IN USE.....		X	X	.	X	X	X	.	X
EXCLUSIVE PED	
	PHASE	9	10	11	12	13	14	15	16
IN USE.....	
EXCLUSIVE PED	

MM-1-3 Program load switch assignments as follows:

LD	SWITCH	ASSIGN								v
PHASE	DIMMING	---FLASH---								
/OVLP	TYPE	R	Y	G	D	PWR	AUT	TGR		
1	1	V	.	.	.	+	A	R	.	
2	2	V	.	.	.	+	A	R	X	
3	5	V	.	.	.	+	A	R	.	
4	6	V	.	.	.	+	A	R	.	
5	4	P	.	.	.	-	A	R	.	
6	8	P	.	.	.	-	A	R	X	
7	0	V	.	.	.	-	A	.	.	
8	0	V	.	.	.	-	A	.	.	
9	0	P	.	.	.	+	A	.	.	
10	0	P	.	.	.	+	A	.	.	
11	0	P	.	.	.	-	A	.	.	
12	0	P	.	.	.	-	A	.	.	
13	0	0	.	.	.	+	A	.	.	

Logic Processor Programming

MM-1-8-2 Program LP steps 101-105 as follows (or other LP steps could be used)

LP 101

```

IF      LP FLAG                16 IS ON

THEN LP DELAY FOR              0.5 SECONDS
      LP SET LOGIC FLAG        16 OFF

ELSE LP DELAY FOR              0.5 SECONDS
      LP SET LOGIC FLAG        16 ON

```



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LP 102

IF	VEH GREEN ON PH	2 IS ON
AND	PED ON PH WALK	2 IS ON
AND	CTR ON PH PED CHK	4 IS OFF
THEN	CTR HOLD PHASE	2 ON

LP 103

IF	PED ON PH PED CLR	2 IS ON
AND	LP FLAG	16 IS ON
THEN	SIG SET PH YELLOW	2 ON
	SIG SET PH YELLOW	6 ON

LP 104

IF	PED ON PH PED CLR	4 IS ON
OR	VEH RED ON PHASE	4 IS ON
AND	VEH RED ON PHASE	2 IS ON
AND	LP FLAG	16 IS ON
AND	CTR PHASE TIMING	4 IS ON
THEN	SIG SET PHASE RED	1 ON
	SIG SET PHASE RED	5 OFF

LP 105

IF	PED ON PH PED CLR	4 IS ON
OR	VEH RED ON PHASE	4 IS ON
AND	VEH RED ON PHASE	2 IS ON
AND	LP FLAG	16 IS OFF
AND	CTR PHASE TIMING	4 IS ON
THEN	SIG SET PHASE RED	1 OFF
	SIG SET PHASE RED	5 ON



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Extended Options File

Edit the ASC3.ext file to include the following:

CONFIG=HAWK PED OPERATION

1.101.105. HAWK PED ph 4

Download the ASC3.ext to the controller

MMU Monitoring

The MMU must be configured for the FYA Type 12 mode of operation, with the MMU monitoring the Flashing Yellow arrow on the load switches. Also ballast resistors must be placed on all un-used load switch outputs.