TrafficLight2 Example

The TrafficLight2 example builds on the simple TrafficLight1 example, and adds on-demand or conditional sequencing.

On Sheet 2 we have added Doppler approach detectors and threshold detector pads to the East-West direction. In order to favour traffic on the North-South route, E-W will remain on red until either of its approach detectors is triggered.
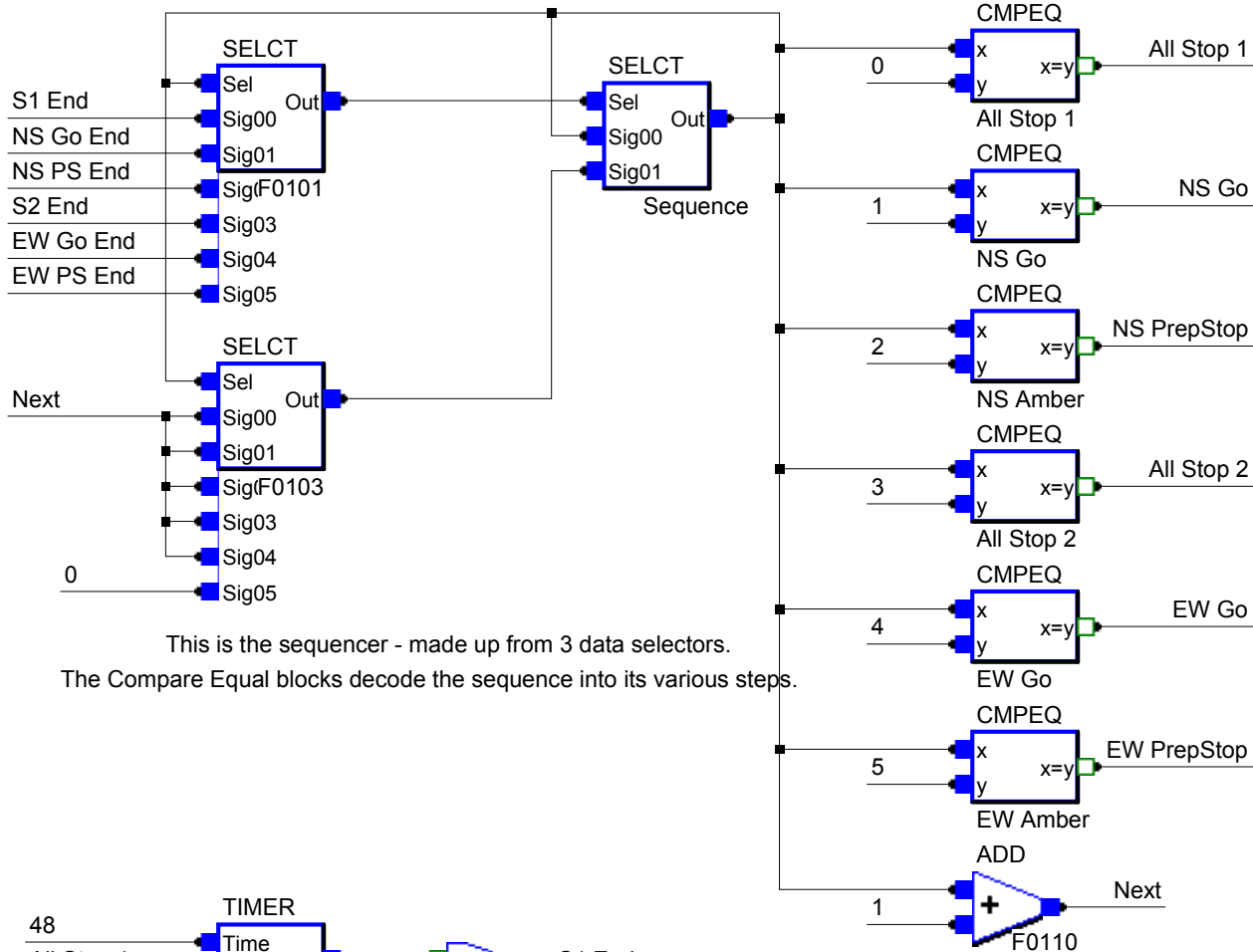
Note the interaction between the Doppler and Threshold detectors. We can safely assume that if a vehicle has arrived at the threshold, its Doppler trigger will no longer be required.

SELCT (Sequence)

SELCT

- Sel
- Sig00 — S1 End
- Sig01 — NS Go End
- Sig02 — NS PS End
- Sig03 — S2 End
- Sig04 — EW Go End
- Sig05 — EW PS End
- Out

F0101

SELCT

- Sel — Next
- Sig00
- Sig01
- Sig02 F0103
- Sig03
- Sig04
- Sig05 — 0
- Out

SELCT

- Sel
- Sig00
- Sig01
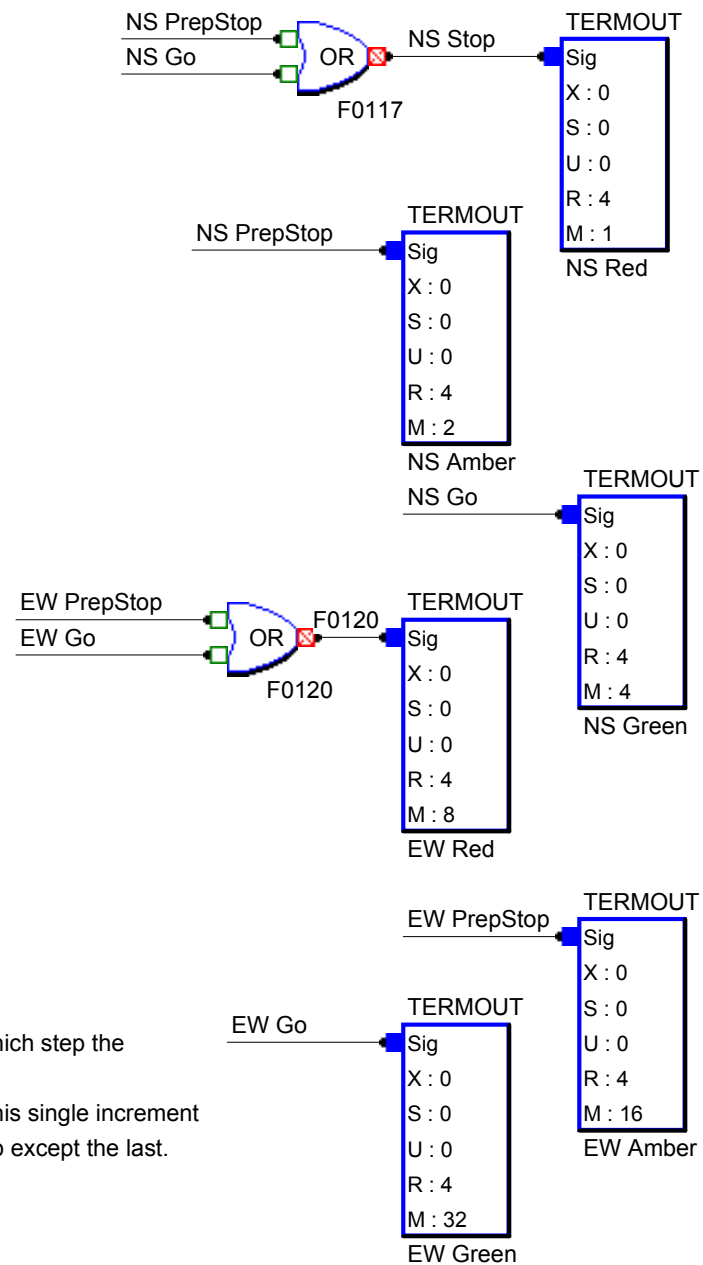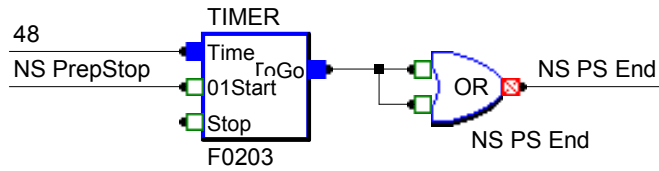- Out

Sequence

This is the sequencer - made up from 3 data selectors.
The Compare Equal blocks decode the sequence into its various steps.

CMPEQ blocks

CMPEQ — 0 → x, y; x=y → All Stop 1
All Stop 1

CMPEQ — 1 → x, y; x=y → NS Go
NS Go

CMPEQ — 2 → x, y; x=y → NS PrepStop
NS Amber

CMPEQ — 3 → x, y; x=y → All Stop 2
All Stop 2

CMPEQ — 4 → x, y; x=y → EW Go
EW Go

CMPEQ — 5 → x, y; x=y → EW PrepStop
EW Amber

ADD — 1 → + → Next
F0110

This block generates the Next signal which determines which step the
sequencer will go to when the 'End' signal is generated.
Since this sequencer always moves on to the next step, this single increment
block can be used to generate the next step for every step except the last.

TIMER

TIMER
- 48 → Time
- All Stop 1 → ToGo
- 01 Start
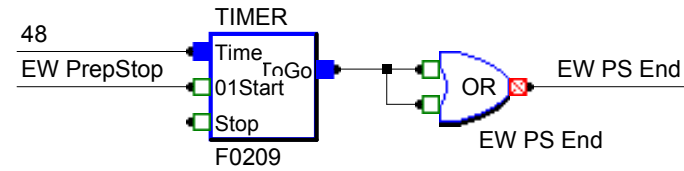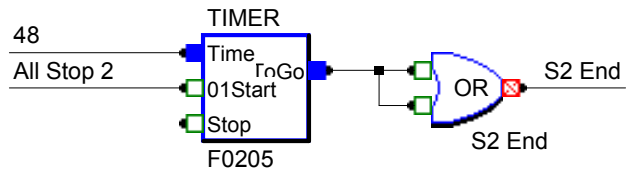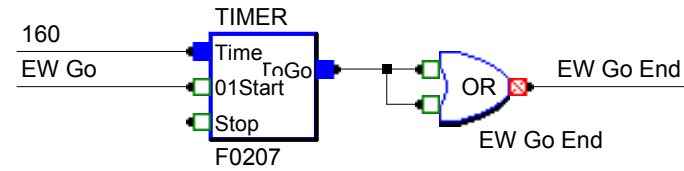- Stop

S1 Timer

OR F0119 → S1 End

This timer sets the time for which the All Stop 1 step lasts.
The timers for the other steps are on Sheet 2.
The unwired Stop input behaves as if it did not exist.

Output section

NS PrepStop, NS Go → **OR** F0117 → NS Stop

TERMOUT
- Sig
- X : 0
- S : 0
- U : 0
- R : 4
- M : 1

NS Red

NS PrepStop → **TERMOUT**
- Sig
- X : 0
- S : 0
- U : 0
- R : 4
- M : 2

NS Amber

NS Go → **TERMOUT**
- Sig
- X : 0
- S : 0
- U : 0
- R : 4
- M : 4

NS Green

EW PrepStop, EW Go → **OR** F0120 → F0120

TERMOUT
- Sig
- X : 0
- S : 0
- U : 0
- R : 4
- M : 8

EW Red

EW PrepStop → **TERMOUT**
- Sig
- X : 0
- S : 0
- U : 0
- R : 4
- M : 16

EW Amber

EW Go → **TERMOUT**
- Sig
- X : 0
- S : 0
- U : 0
- R : 4
- M : 32

EW Green

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TRAFFIC LIGHTS 2 - Sheet 1

48
NS PrepStop

TIMER
Time ⌐∩Go
01Start
Stop
F0203

OR — NS PS End
NS PS End

160
EW Go

TIMER
Time ⌐∩Go
01Start
Stop
F0207

OR — EW Go End
EW Go End

This timer is 48 / 16 = 3 seconds. The 16 is the scan rate in Hz.

48
All Stop 2

TIMER
Time ⌐∩Go
01Start
Stop
F0205

OR — S2 End
S2 End

48
EW PrepStop

TIMER
Time ⌐∩Go
01Start
Stop
F0209

OR — EW PS End
EW PS End

Now we decide that the NS direction is a major road.
We will only end its Go period if there is a request from the minor road
after its Go timer has expired.

160
NS Go

TIMER
Time ⌐∩Go
01Start
Stop
F0201

F0201

TERMIN
X : 0
S : 0   Sig
U : 0
R : 1
M : 1
EW Doppler

LATSR
01Set
Reset   Out
EW Appr Latch

EW Appr Latch

OR
EW Proceed RQ

AND — NS Go End
F0214

TERMIN
X : 0
S : 0   Sig
U : 0
R : 1
M : 2
EW Threshold
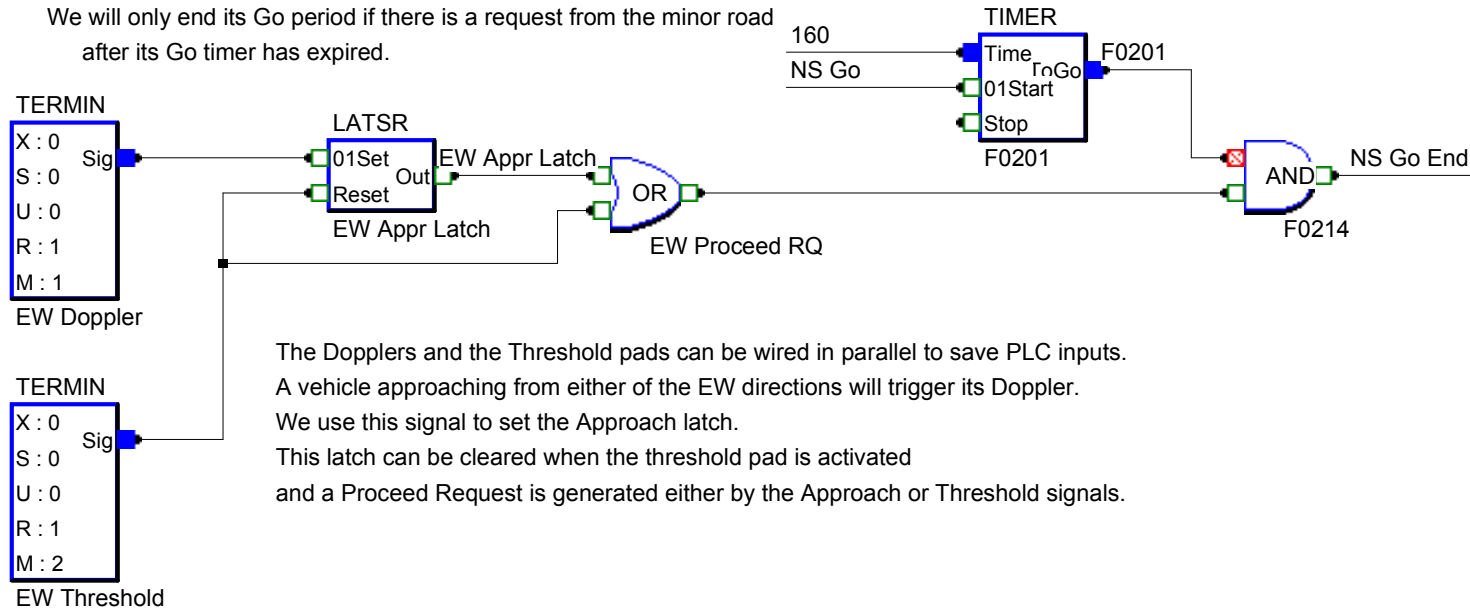
The Dopplers and the Threshold pads can be wired in parallel to save PLC inputs.
A vehicle approaching from either of the EW directions will trigger its Doppler.
We use this signal to set the Approach latch.
This latch can be cleared when the threshold pad is activated
and a Proceed Request is generated either by the Approach or Threshold signals.

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TRAFFIC LIGHTS 2 - Sheet 2