



Pilotage d'une machine d'essais mécaniques

- 1) Descriptif d'une machine d'essais et d'un essai de traction
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Descriptif machine de traction / compression

F_{max} : 20 kN (2000 DaN)

20 kN à 100 N

2 kN à 10 N

500 N à 2,5 N

10 N à 0,1 N

D_{max} : 1000 mm à 0,01 mm

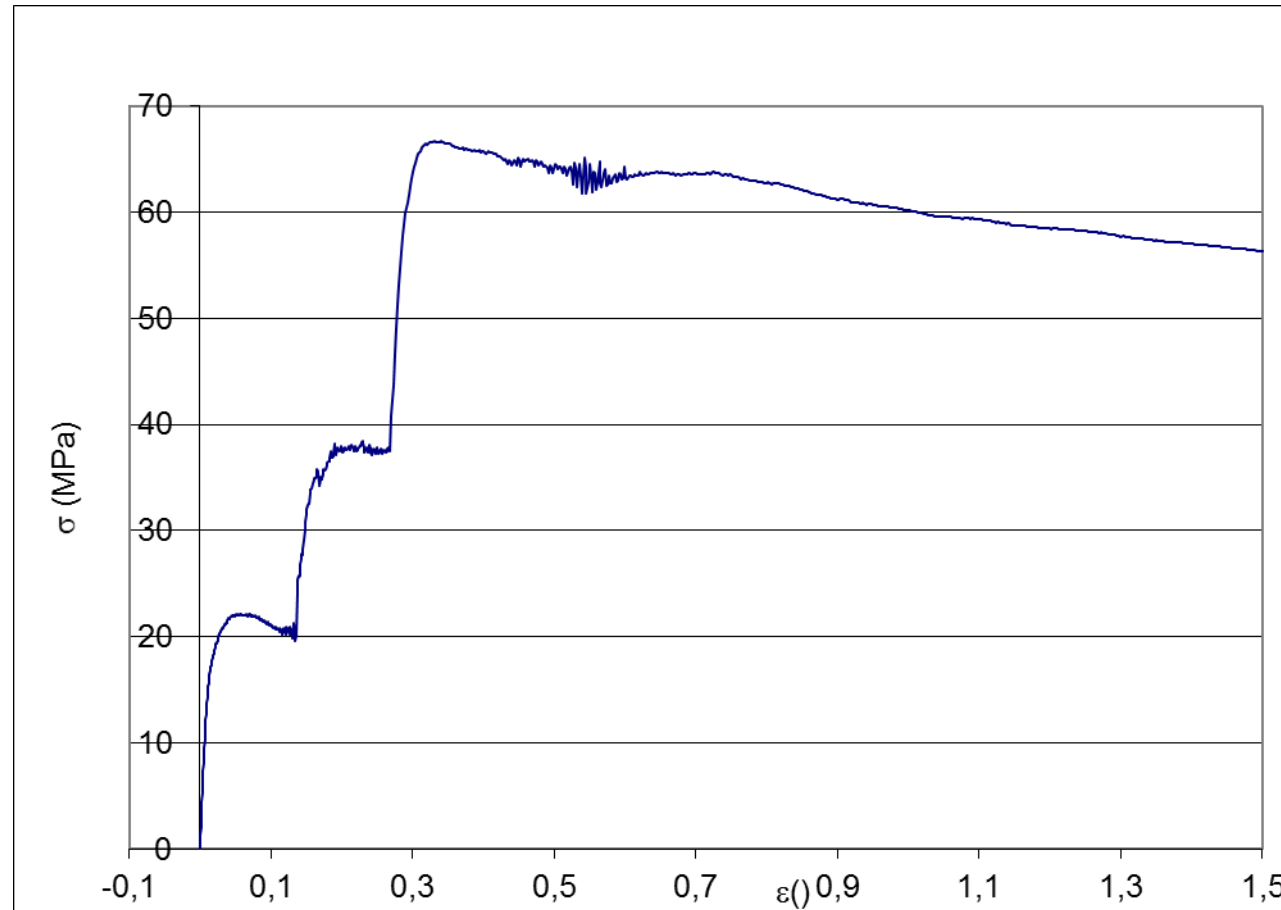
V_{max} : 500 mm/mn

0 → 99 mm/mn (1,65 mm/s) : 0,001 mm/mn (17 μm/s)

100 → 500 mm/mn : 0,01 mm/mn

f_{max} : 20 Hz → 10Hz

Essai de traction



$$\sigma = F / S$$

$$\epsilon = \ln (l / l_0)$$

$$\dot{\epsilon} = d \epsilon / d t$$

Vitesse de déformation

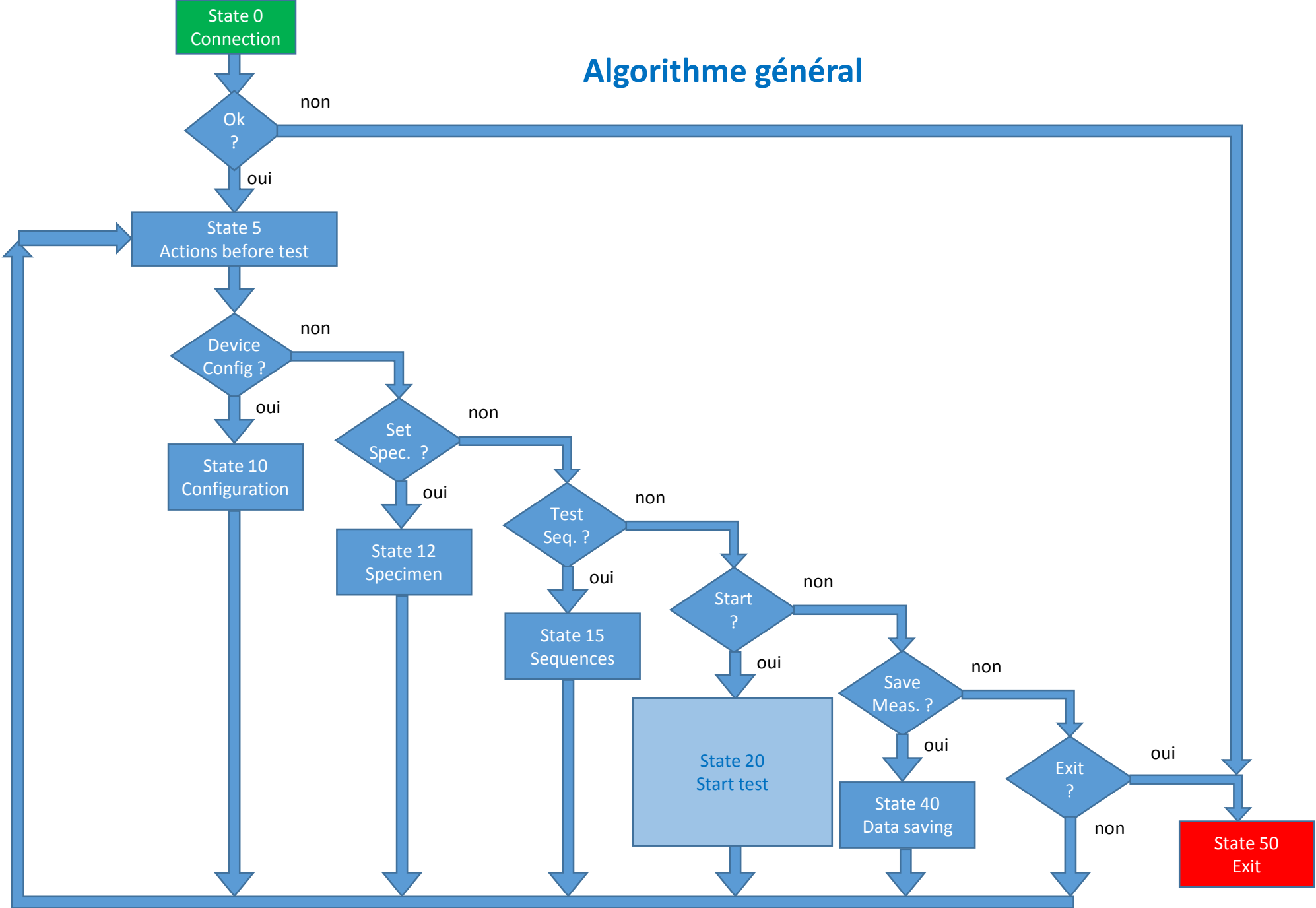
$$\text{Si } \dot{\epsilon} = Cte$$

$$\dot{\epsilon} = V_t / l$$

$$V_t = \dot{\epsilon} * l$$

$$V_t = \dot{\epsilon} * (l_0 \pm \Delta l)$$

Algorithme général



Face avant

Device Name


No Test

Sequence Num

0

Stop

Loading

global Stress = f(global )

Set Device Config

Set Specimen

Set Sequences

Save Data in File

EXIT

Stress (MPa)

3,4

3,4

3,3

3,2

3,1

3,1

-0,0

0,0

Strain ()

0,1

0,1

Start

EMERGENCY STOP

Next sequence

Unloading

Wait

Continue

Travel speed

0

mm/s

Load

0

N

Displacement

0

mm

Loc. Sens.

0

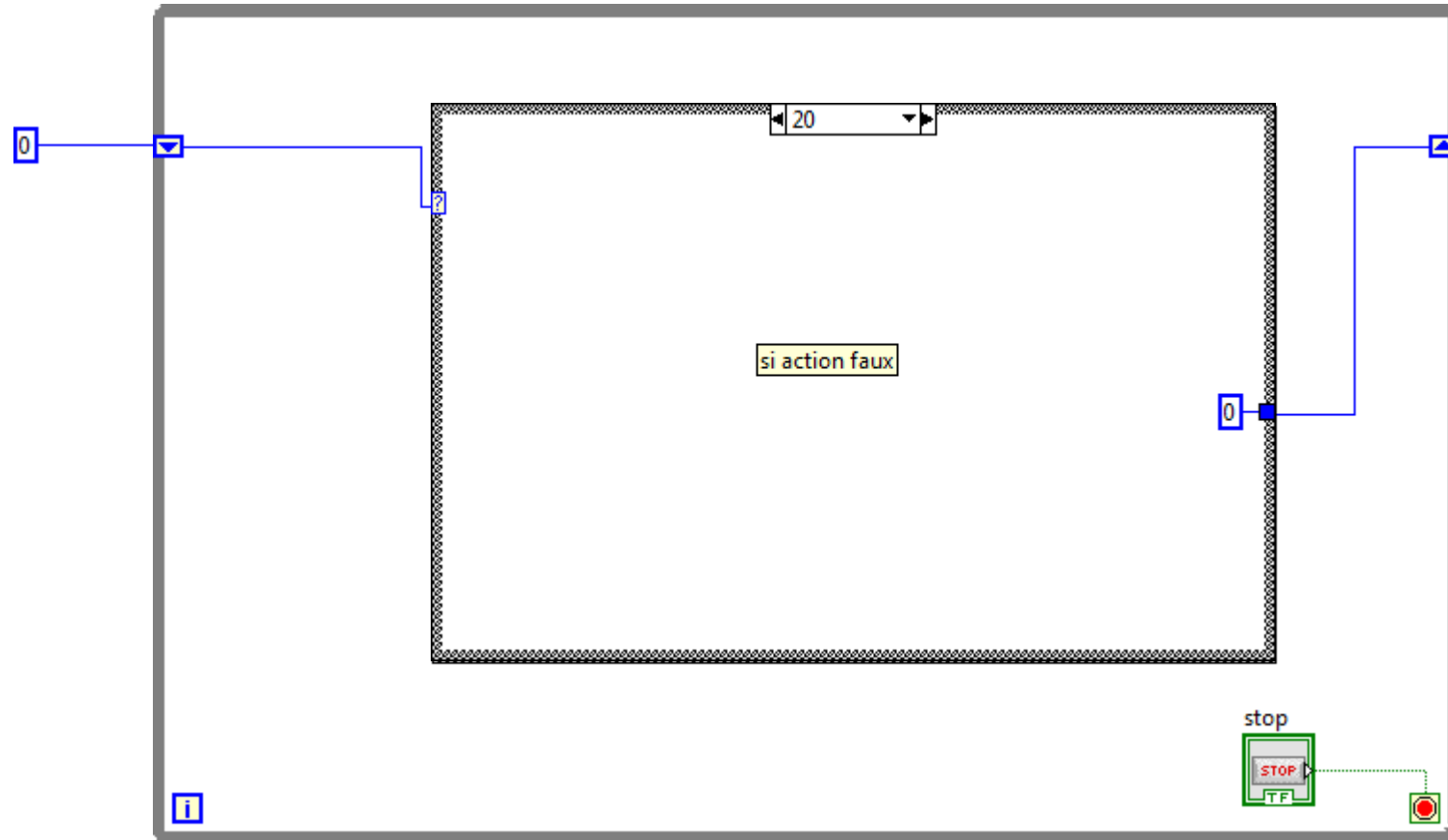
mm

Time

0

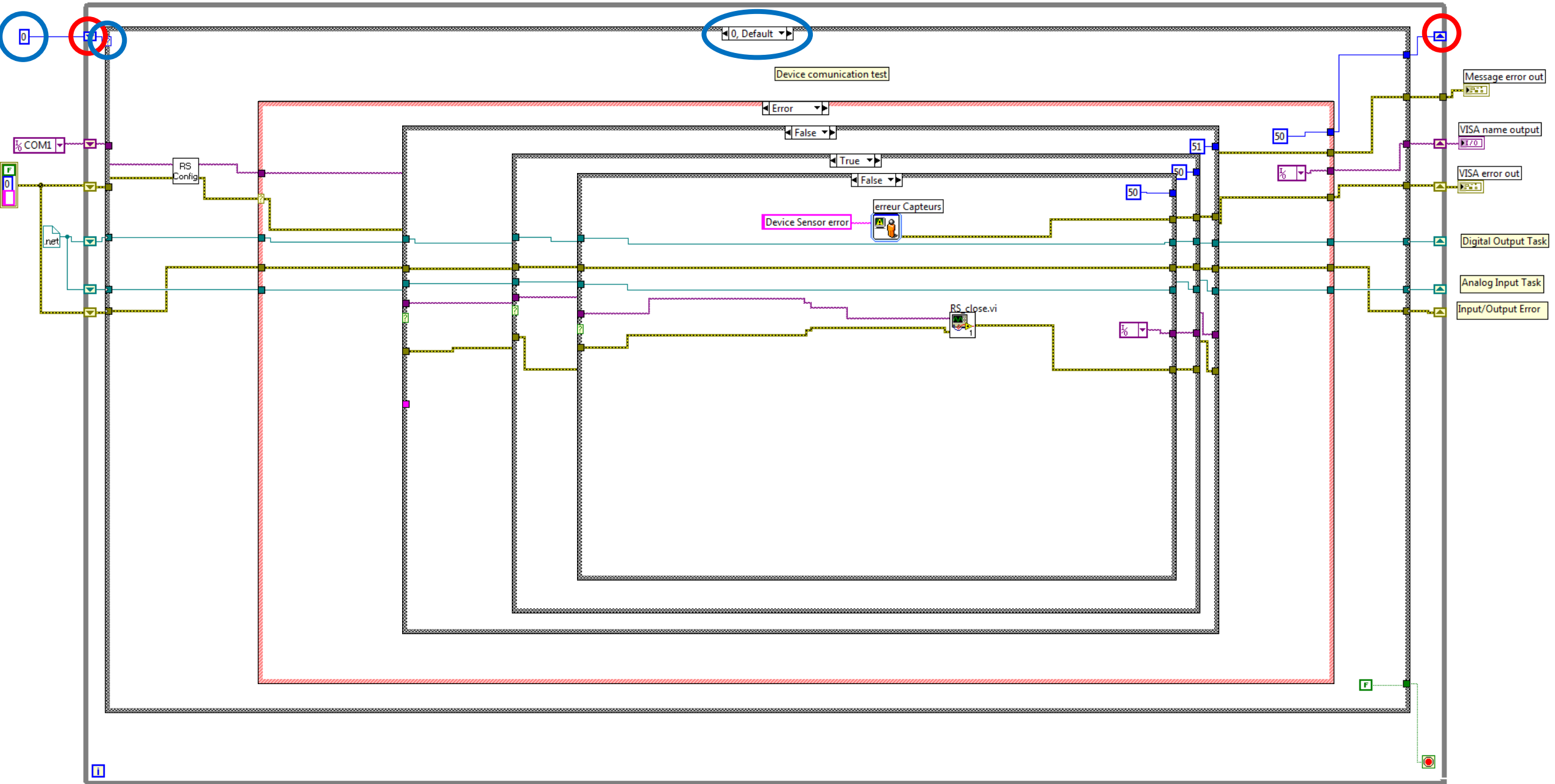
s

Machine à états

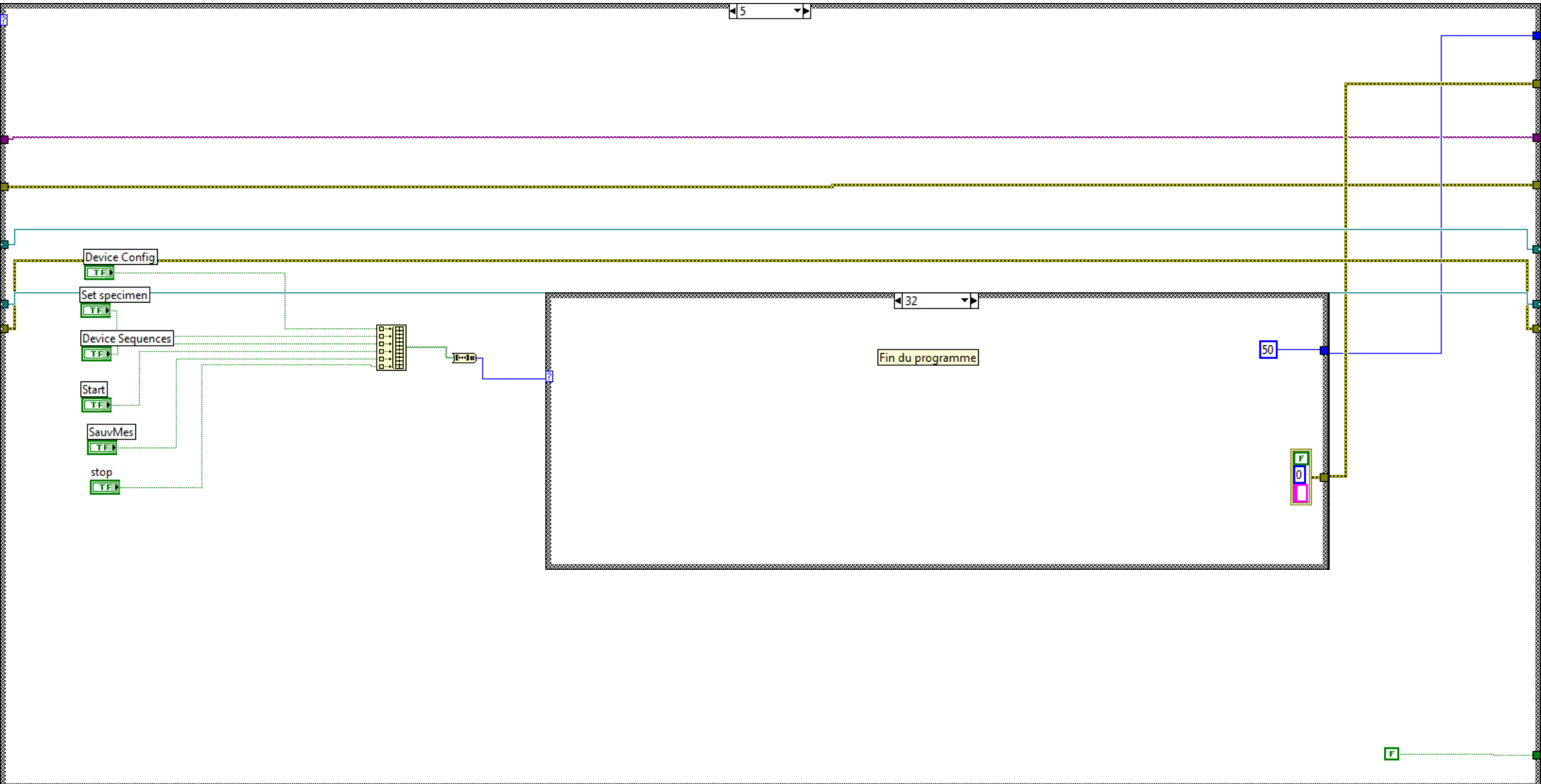


Tunnel →
registre à décalage

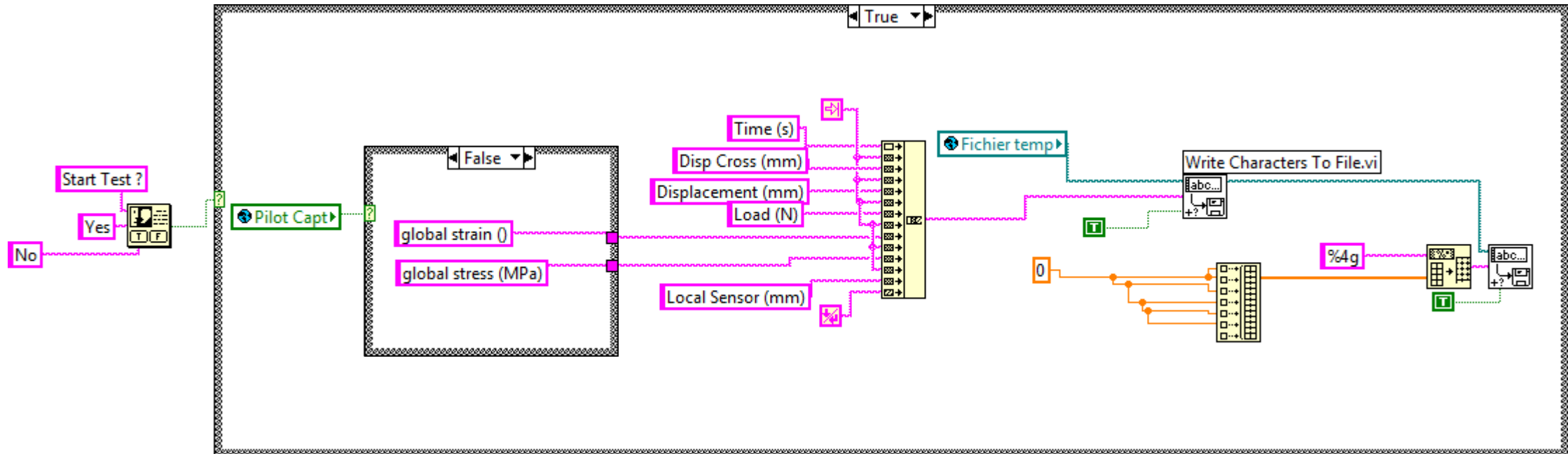
Connexion



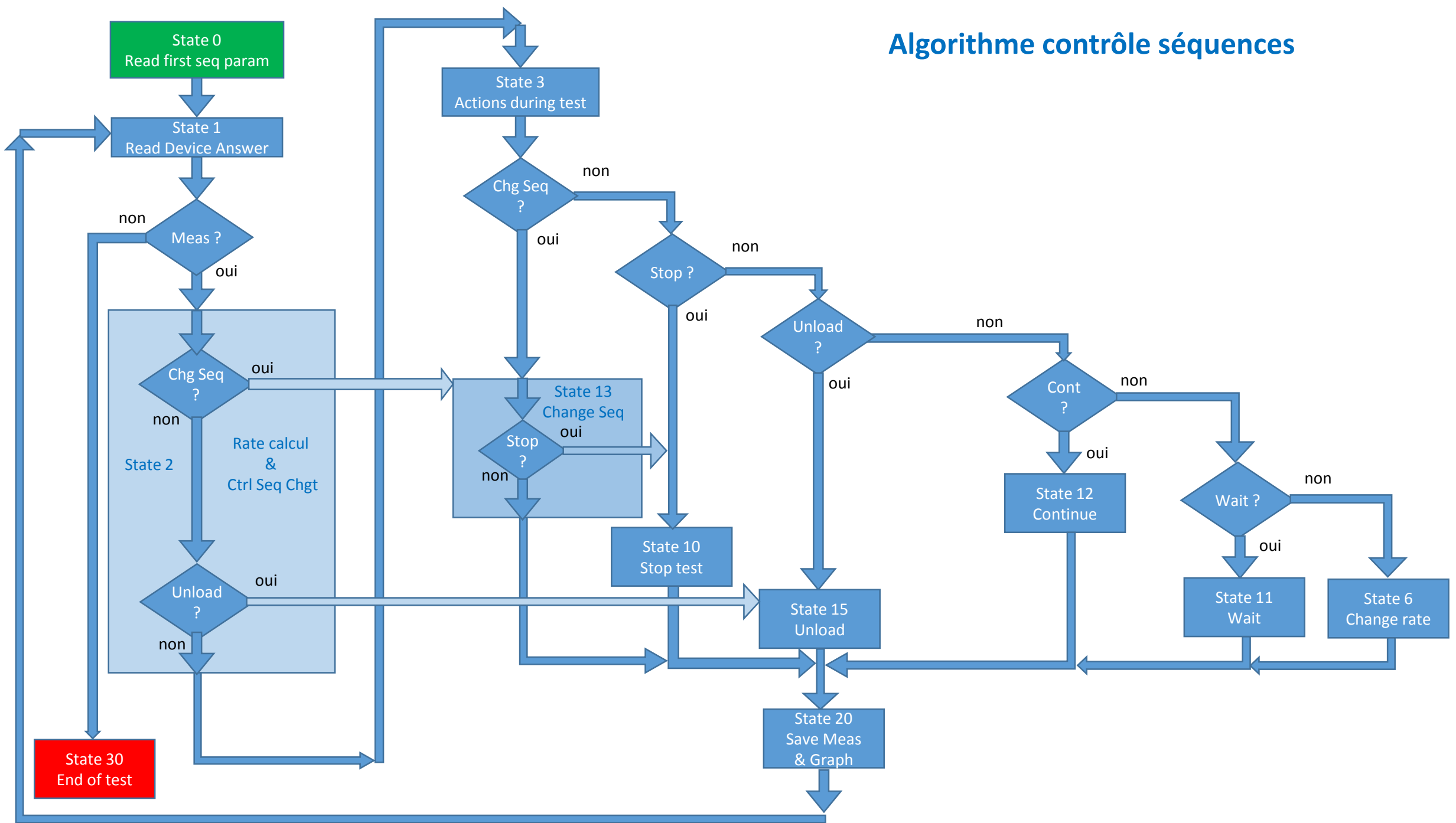
Actions avant essai



Démarrage de l'essai → Création fichier sauvegarde mesures...



Algorithme contrôle séquences



Face avant

Device Name

No Test

Sequence Num

0

Stop



Loading

global Stress = f(global)

Set Device Config

Set Specimen

Set Sequences

Save Data in File

EXIT

Travel speed

0 mm/s

Load

0 N

Displacement

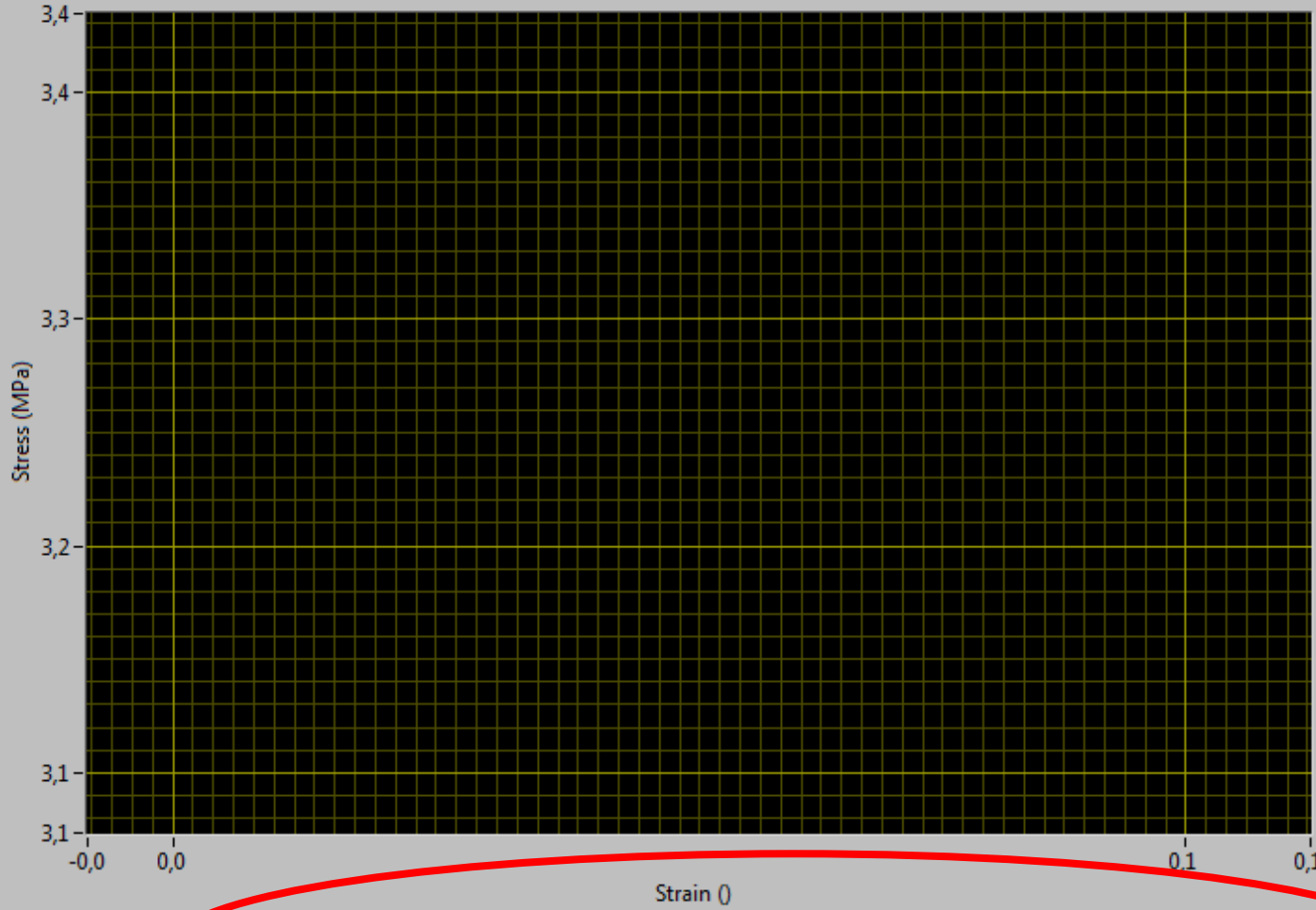
0 mm

Loc. Sens.

0 mm

Time

0 s



Start

EMERGENCY STOP

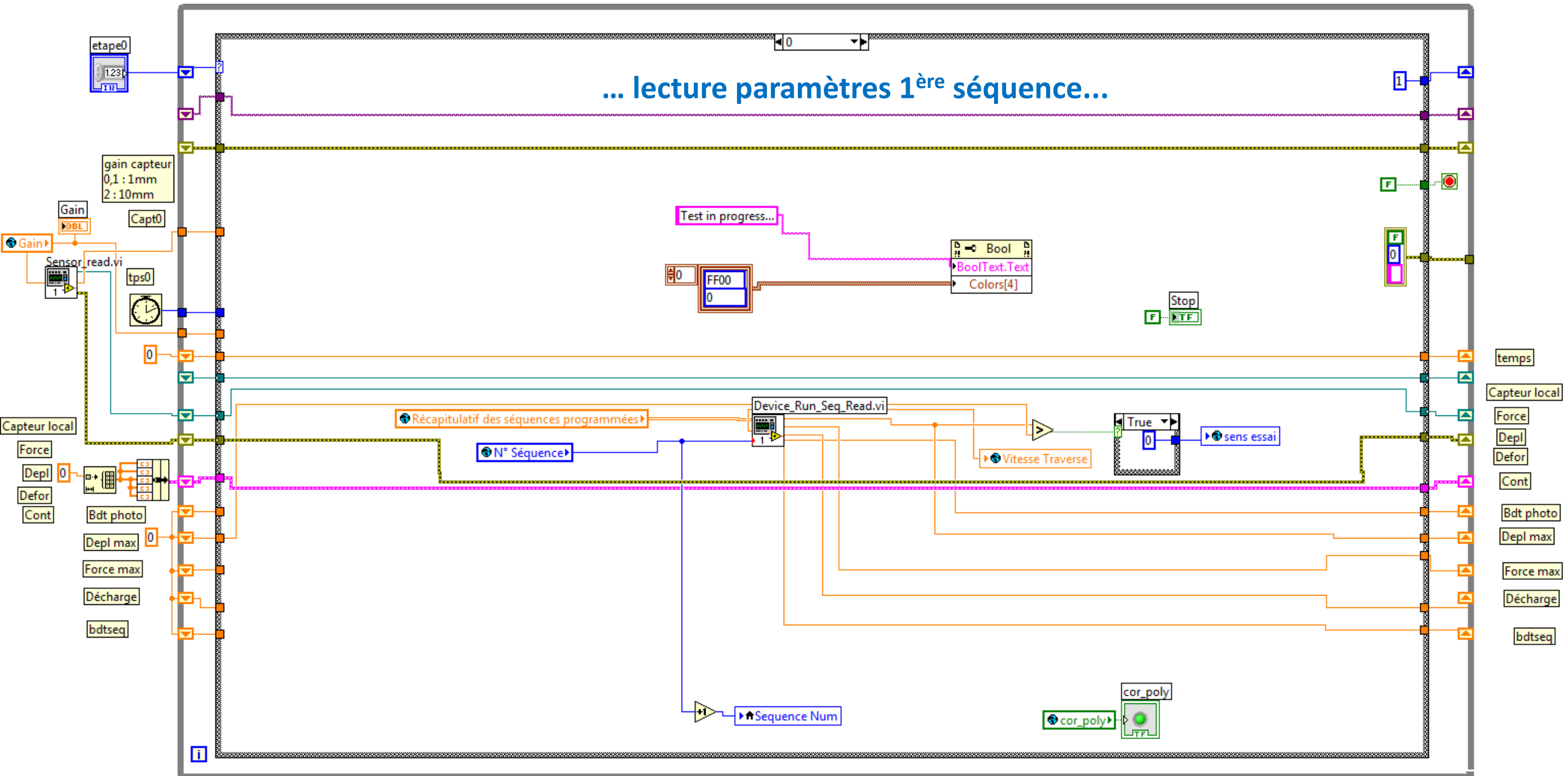
Next sequence

Unloading

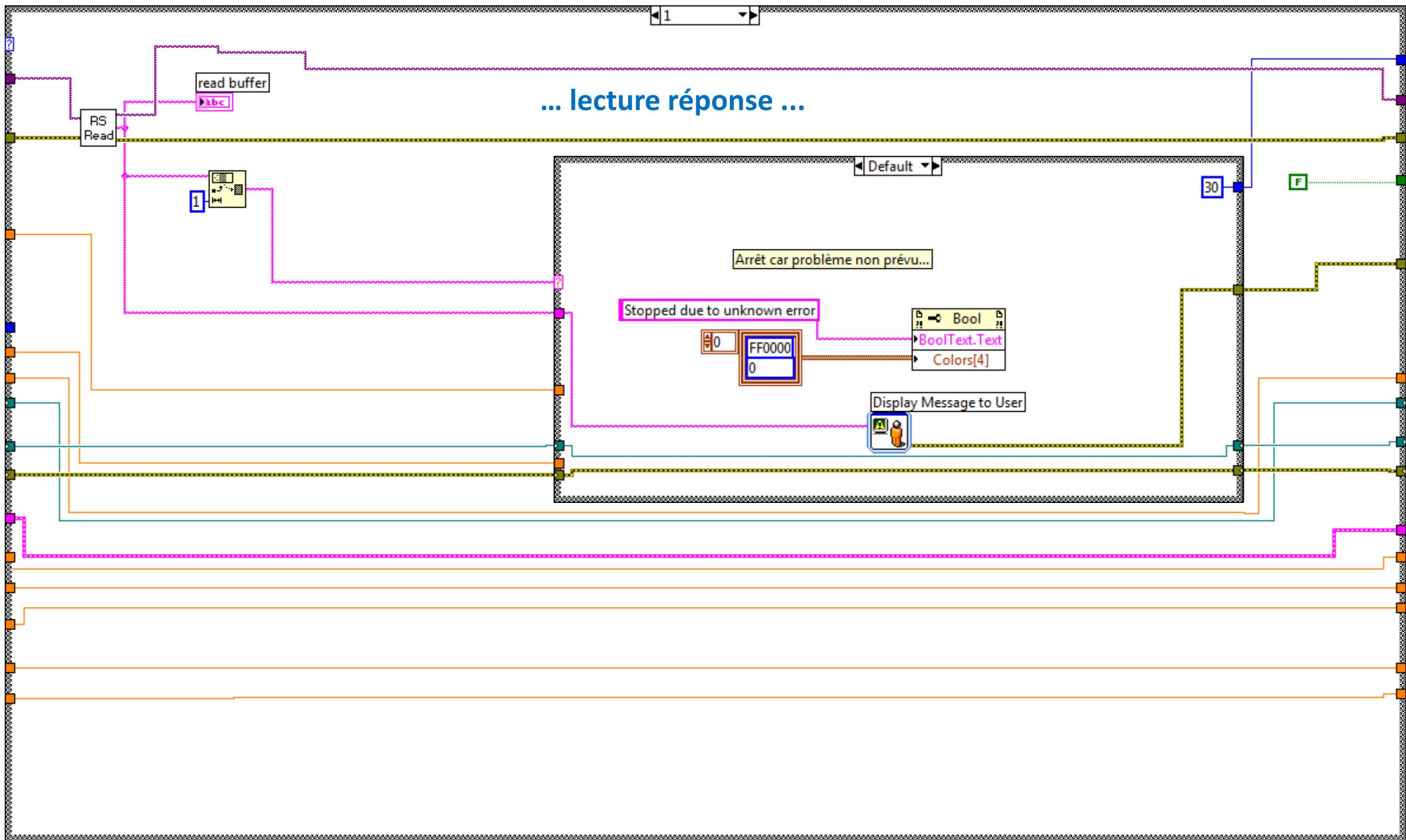
Wait

Continue

... lecture paramètres 1^{ère} séquence...

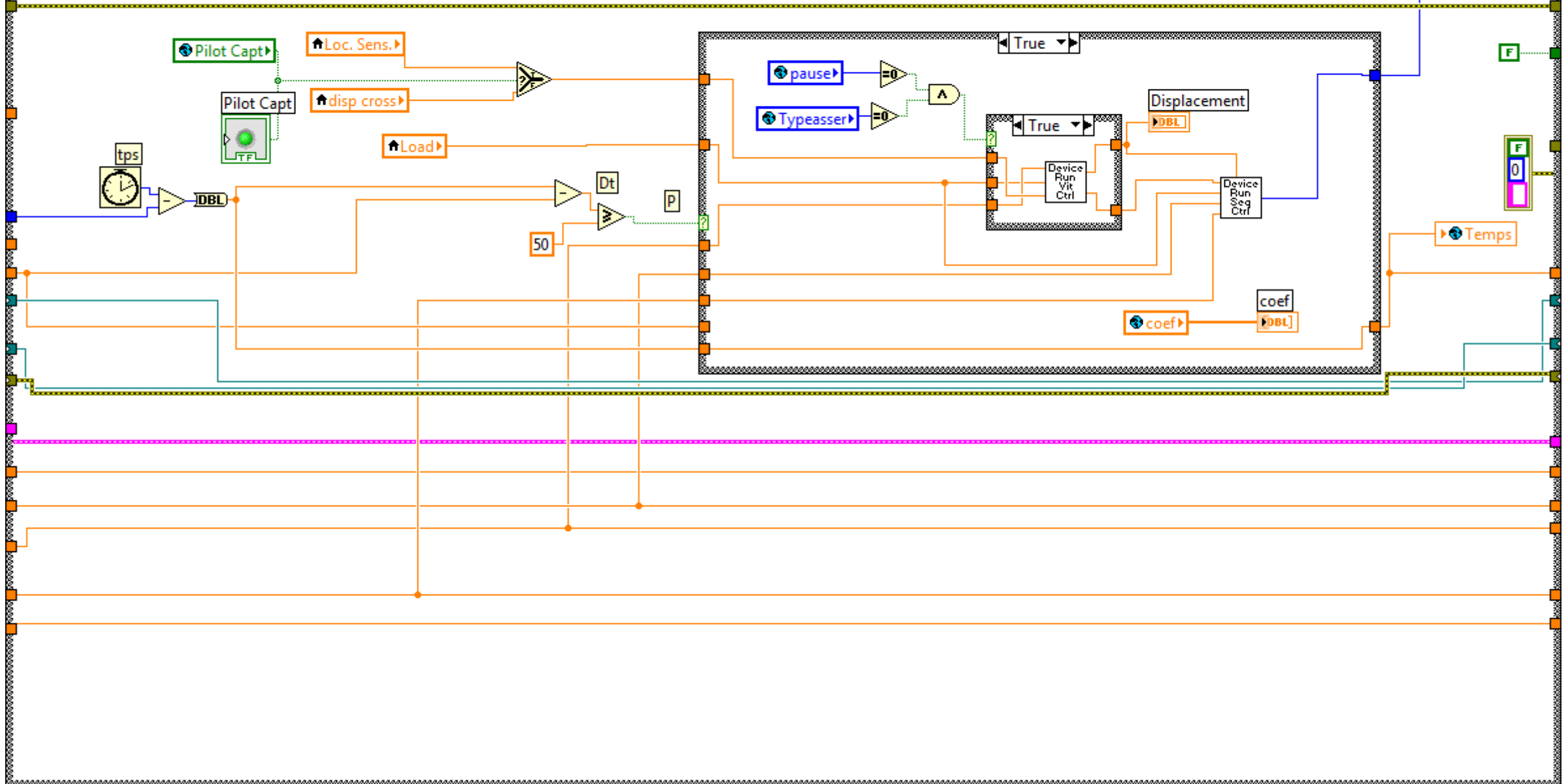


... lecture réponse ...

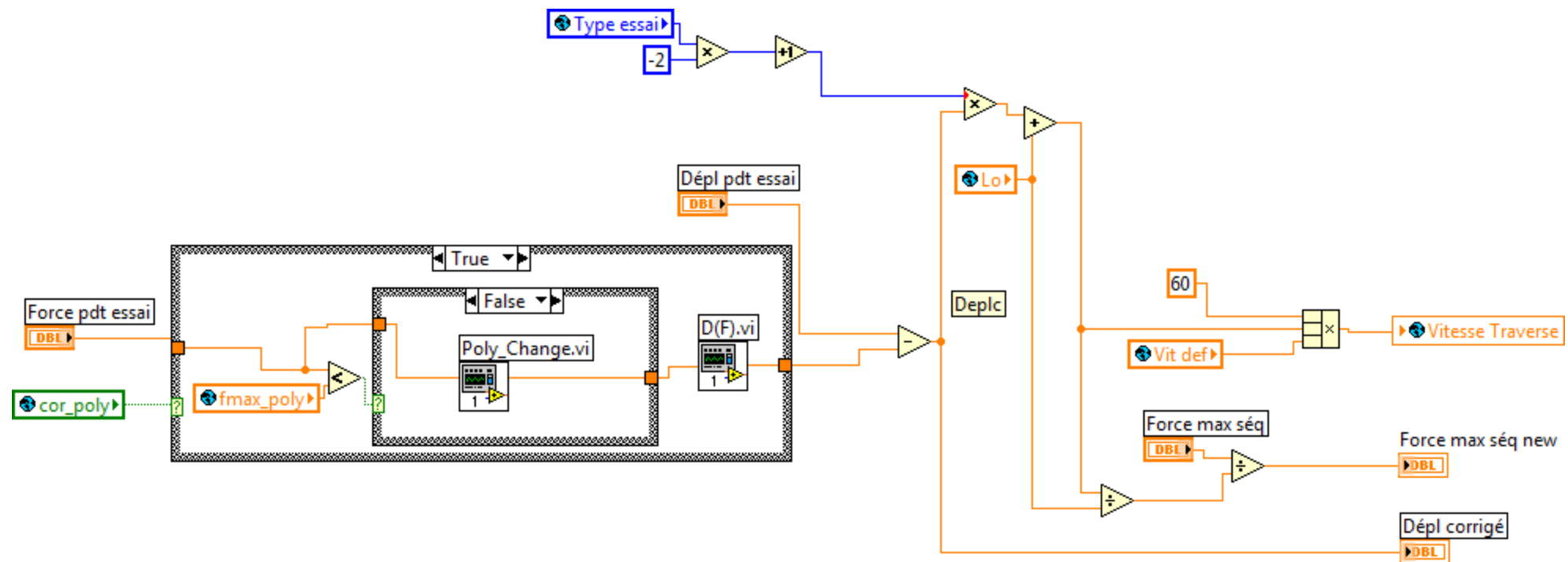


Calcul vitesse traverse et contrôle changement de séquence

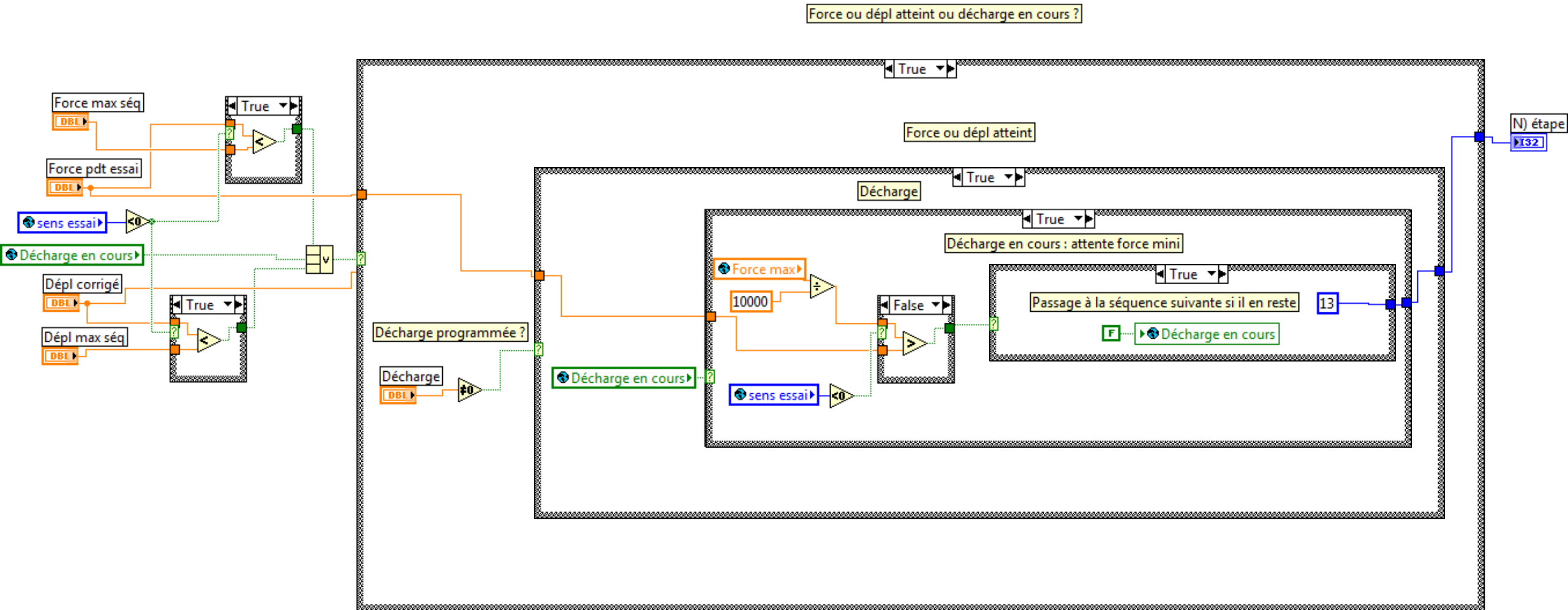
Contrôle Chgt séquence



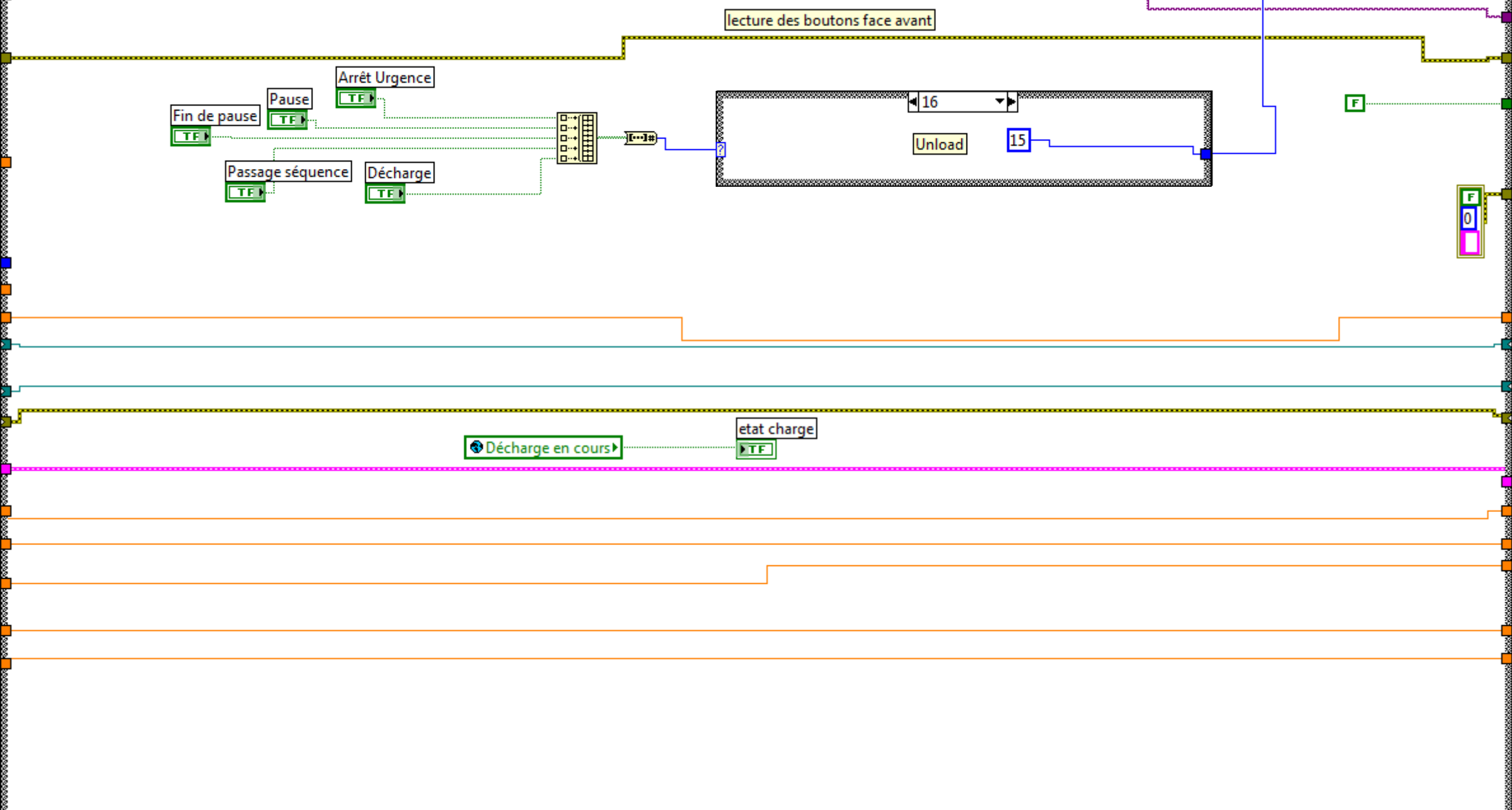
Calcul vitesse traverse



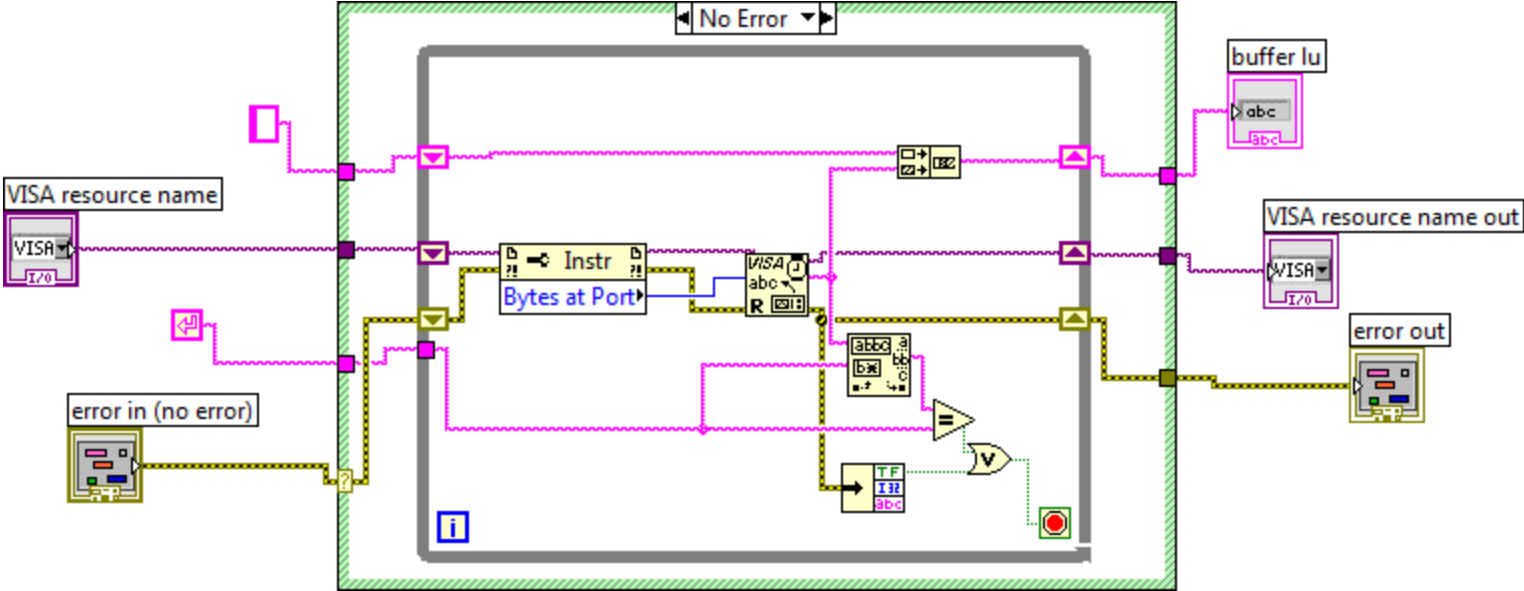
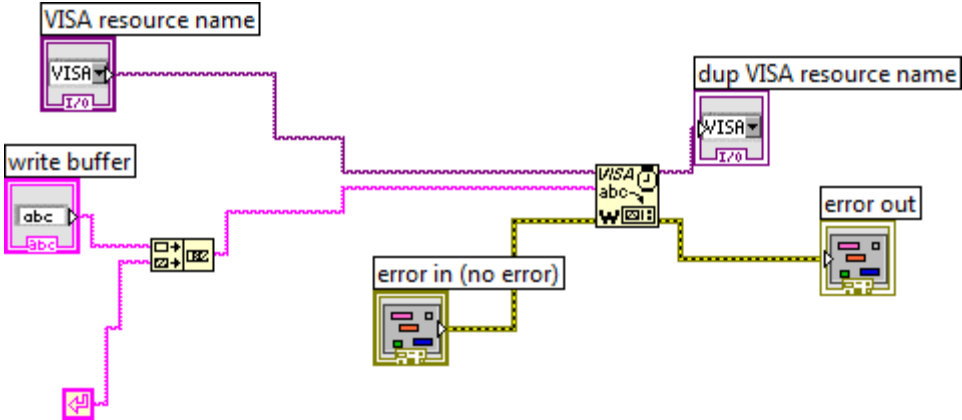
Contrôle changement de séquence



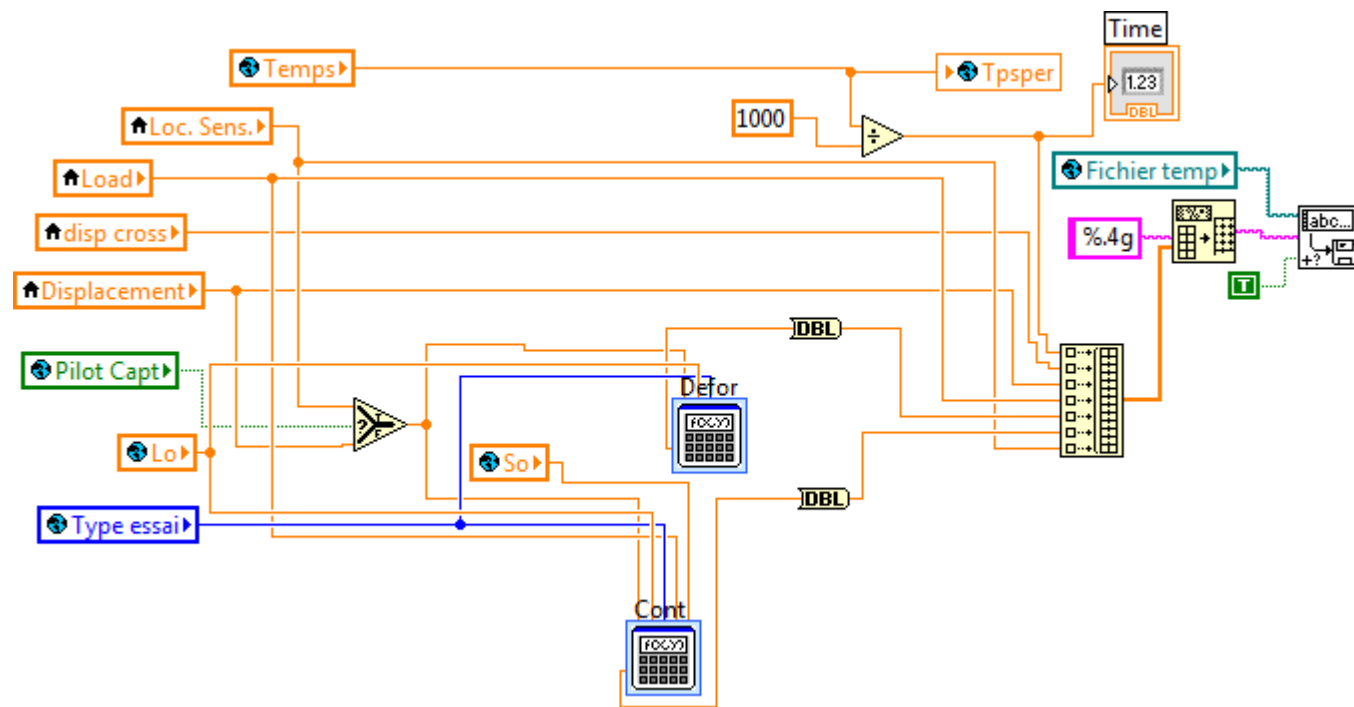
Test action pendant essai



Communication port série



Sauvegarde mesures



Graphe

