

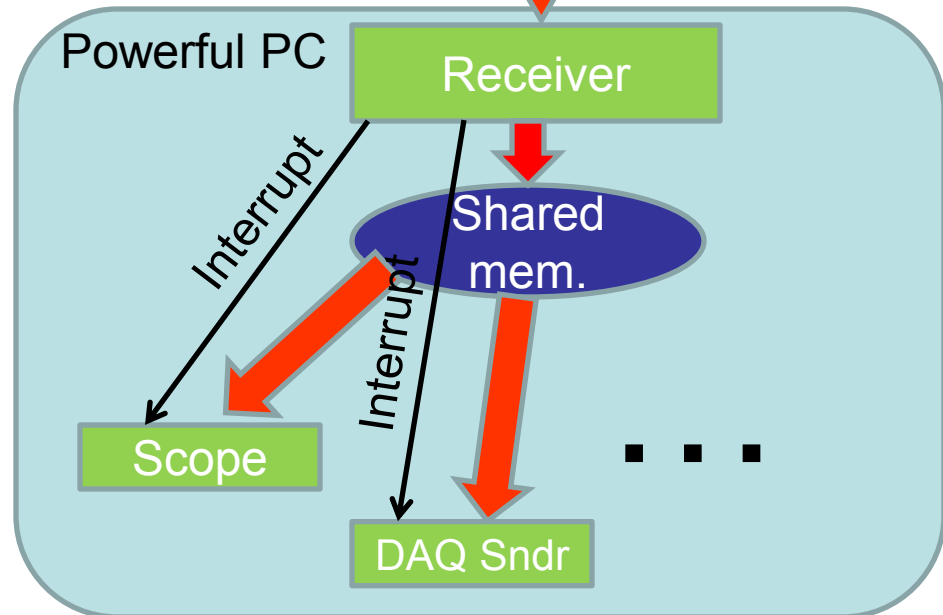
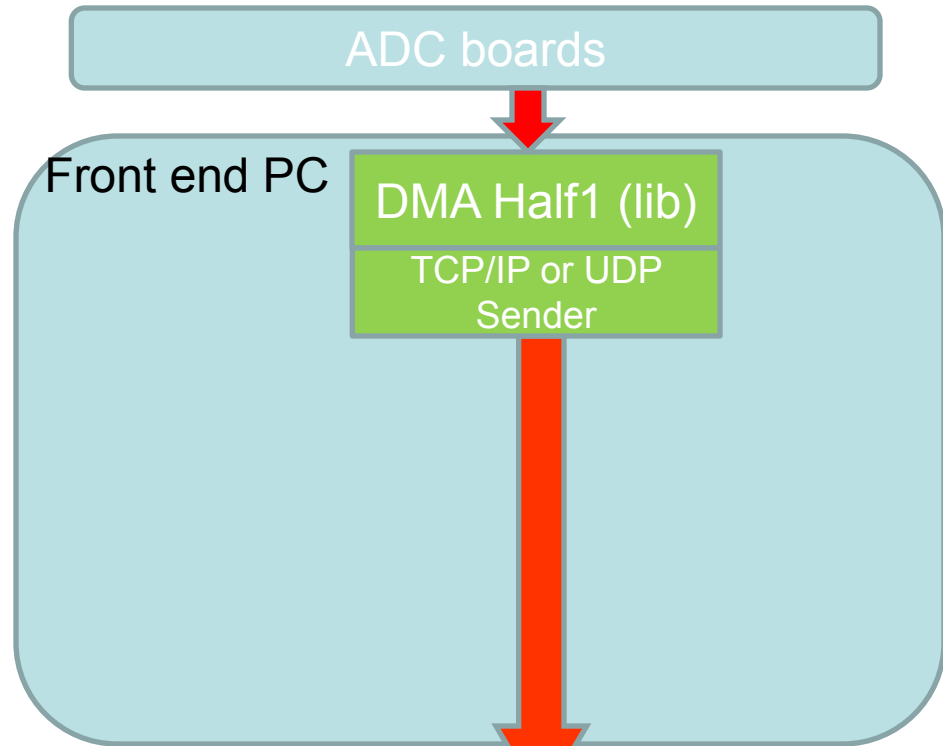
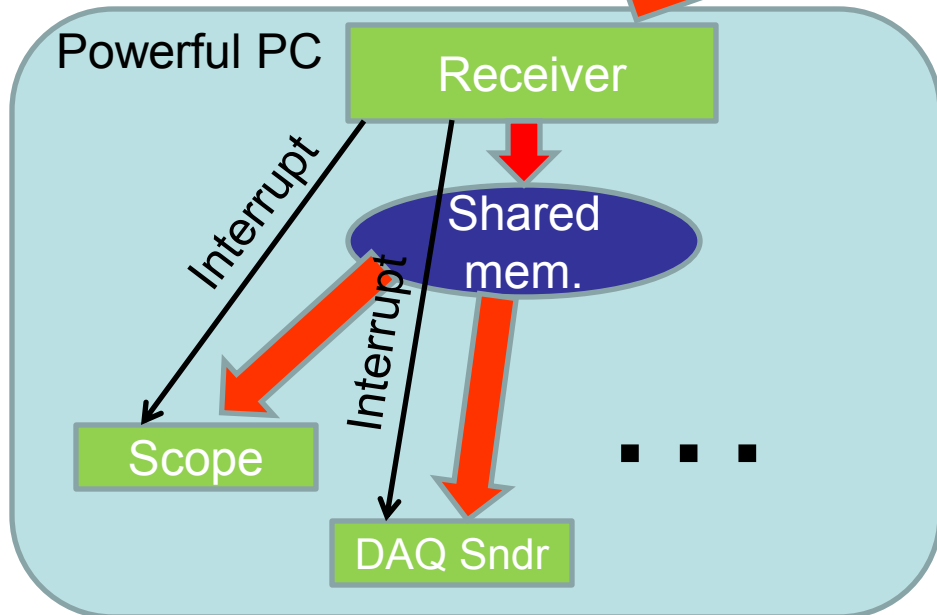
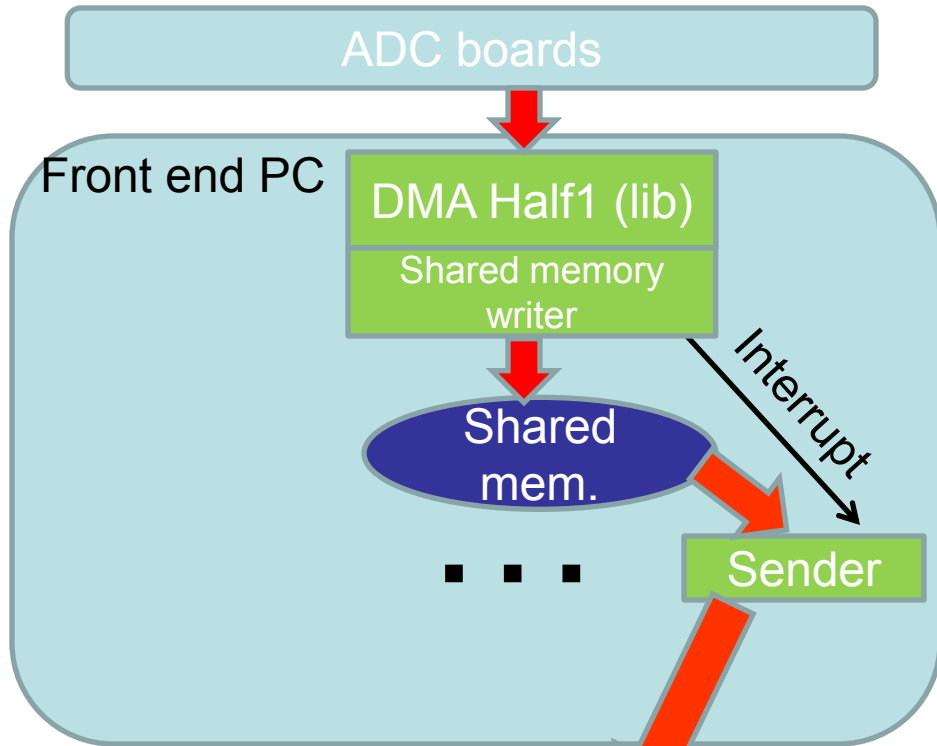
My current activity

01 November 2012

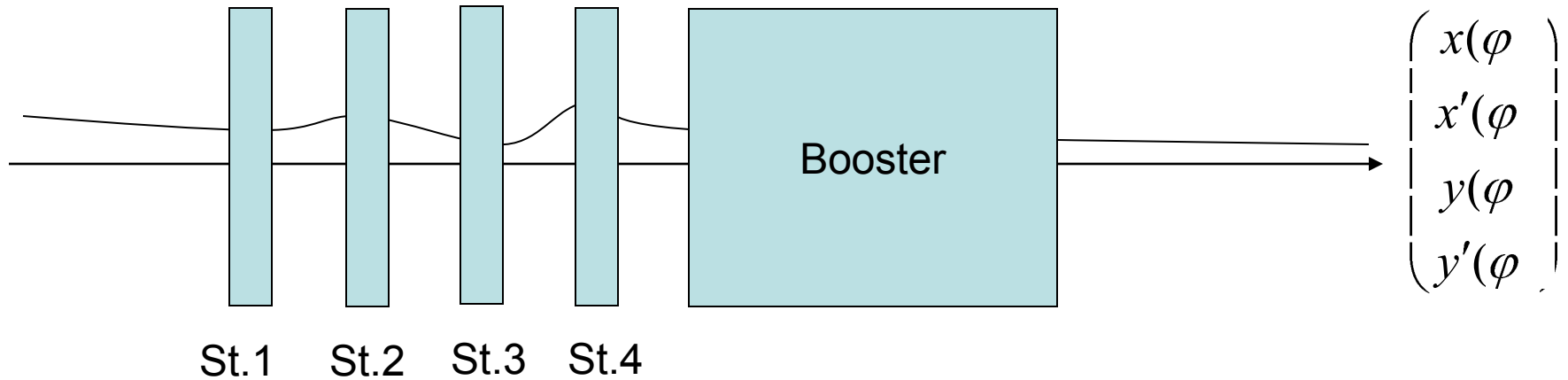
Davit Kalantaryan

List of tasks

1. New schema of ADC data delivery
2. Booster steering functions



Booster steering functions

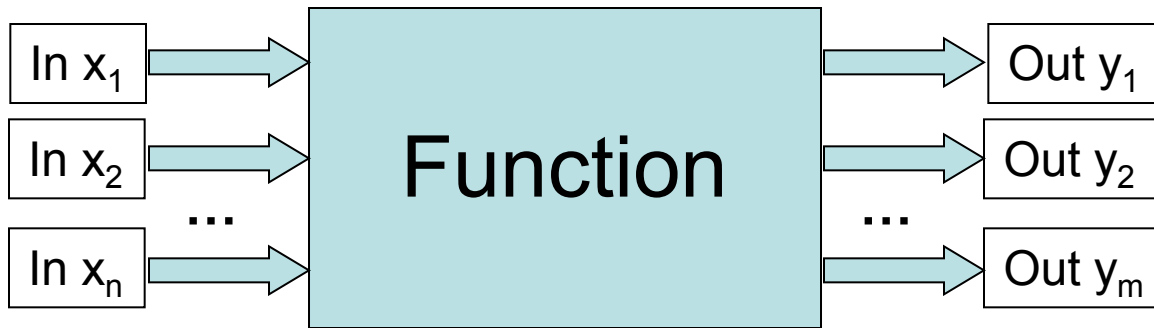


$$\begin{pmatrix} I_1 \\ I_2 \\ I_3 \\ I_4 \end{pmatrix}$$

- > ? to provide after booster

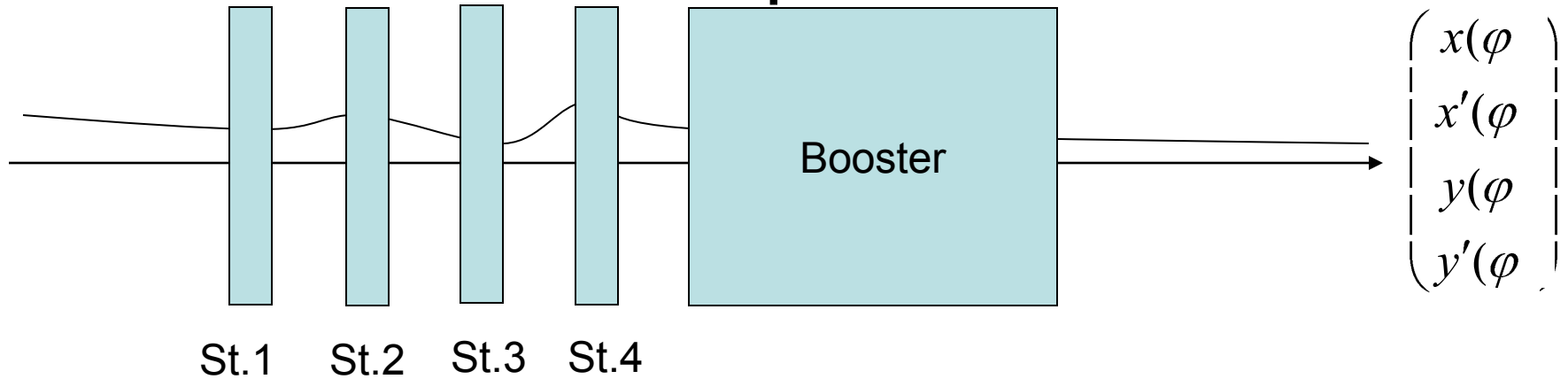
$$\begin{pmatrix} |x_{\max} - x_{\min}| < x_{tol} \\ |x'_{\max} - x'_{\min}| < x'_{tol} \\ |y_{\max} - y_{\min}| < y_{tol} \\ |y'_{\max} - y'_{\min}| < y'_{tol} \end{pmatrix}$$

Optimization procedure



$$\left\{ \begin{array}{l} y_{1d} = F_1(x_1, x_2, \dots, x_n) \\ y_{1d} = F_2(x_1, x_2, \dots, x_n) \\ \dots \\ y_{md} = F_m(x_1, x_2, \dots, x_n) \end{array} \right.$$

Number of all possible cases



$I \in \left[- ; + \right]$ if $I_{acur} = 0.05$, then $N_{iter1} = 20$

For 4 magnets $N_{iter4} = 20^4 = 1,0736 \times 10^8$

For not correlated case $2 \cdot N_{iter2} = 2 \cdot 120^2 = 2.88 \times 10^4$

Each iteration (one set for steerers) needs booster phase scan. If phase scan will consist of 10 phases then 14 DOOCS call (4 for steerers and 10 for booster phase) must be fulfilled during each iteration. One DOOCS call average time is 0.2ms. This means one iteration (with 10 points scan) lasts 2.8ms.

If program will simply go through all possible set of currents then needed time (only for DOOCS calls) will be **16.128 hours**. For not correlated case only **8.064 sec**.

Conclusion on steering functions

Following functions for steering are created or are in preparation stage

1. Group of functions for setting values to devices (steerers, booster).
2. Group of functions for getting beam position. For this purpose two approach are in preparation: A) readout from BPMs B) Readout from screens.
3. Phase scan functions
4. Several optimization algorithms