PS/Int. MG 60-9
26.1.1960

Proposals for the New Linac Timing Pulses.

1. To obtain satisfactory performance of the Linac the Ion Source should be fired twice per second and the rest of the Linac from once ~~to twice~~ per second. This triggering has to work continuously, within the above mentioned rates. Until now difficulties were encountered during the transfer of the Linac Timing from Internal Timing to Machine Timing. Other difficulties came up when changing the magnet repetition rates.

   The Linac Group proposed therefore to include in the new BBC Timer a number of modifications in order to eliminate these troubles.

2. The Linac Timing pulses will be derived after the installation of the new BBC Timer as follows (Fig.1 and 2) :

   2.1. The BBC Timer will send a train of pulses every 0,5 or 0,6 sec. the first for every magnet pulse coinciding with the ~~true~~ true F pulses. These pulses will be used to fire the Ion Source and will be called F + FL1 pulses.

   2.2. Another train of pulses occuring every 1,0 , 1,2 , 1,5 or 1,8 sec.; the first for every magnet pulse coinciding again with the true F pulse, will be sent from the BBC Timer. These pulses will trigger the rest of the Linac and will be called F + FL2 pulses.

   2.3. The intervals of the F + FL1 and F + FL2 pulses were chosen like that to permit repetition rates of 1 - 1,2 - 1,5 - 1,8 - 2,0 - 2,4 - 3,0 - 4,0 and 5,0 seconds.

   A selector on the BBC Timer will select coincidence circuits fed from the BBC decade counters to prodcue the above pulse.

   Thus for a magnet period of 1,8 sec. for instance, the Ion Source will be fired $\frac{1,8}{0,6} = 3$ times and the Linac, once. For a period of 3,0 sec. the Ion Source will be fired $\frac{3,0}{0,5} = 6$ times and the Linac $\frac{3,0}{1,0} = 3$ times, but the first pulses of every cycle for both F + FL1/2 will occur simultaneously with the real F pulse.

2.4. For proper injection the TIT-435 has to substitute F + FL1/2. For that, one OR gate inserted on each of the two channels from BBC-Timer to Linac will switch to the TIT-435 input, transmitting this, instead of F + FL 1/2.

As TIT-435 occurs after F + FL1/2, one delay inserted to each of the two channels will lag F + FL1/2 slightly after TIT-435.
These two delays have to be adjusted properly to suit various $\overset{o}{B}$.

2.5. The transfer from the Linac Internal Timing to the Machine Timing will be made through a simple transfer relay controlled from the ON-OFF buttons of MPS with the necessary interlock facilities provided for Linac's safety and convenience.

3. **The various parts of the above systen will be installed as follows:**

3.1. The necessary shapers to transform the train of F + FL1/2 pulses to CERN standard pulse will be identical to the existing F-shapers and will be installed on the MPS Control Desk next to the existing shapers.

3.2. The variable delays will be installed by the Linac on the MPS Control Desk. If it will be acceptable to have non-uniform intervals between F + FL of the order of $\pm$ 30 msec., then it is possible to include these two delays (fixed) in the OR gates.

3.3. The OR gates will be installed in the Computer Room by the R.F. Group.

3.4. The transfer relay will be included in the Linac Internal Timing.

4. The following items have to be developped, constructed and installed.

4.1. Two shapers for F + FL1/2. They will be installed on the MPS desk.

4.2. Two variable delays with CERN standard pulse input and output and delay according to Linac requirements.

4.3. Two OR gates with CERN standard pulse input and output. Autoratic switching by one of the incoming pulses (TIT-435) and reset delayed from switching by 1 msec.

4.4. The transfer relay will be connected by the **Linac** to the MPS desk.

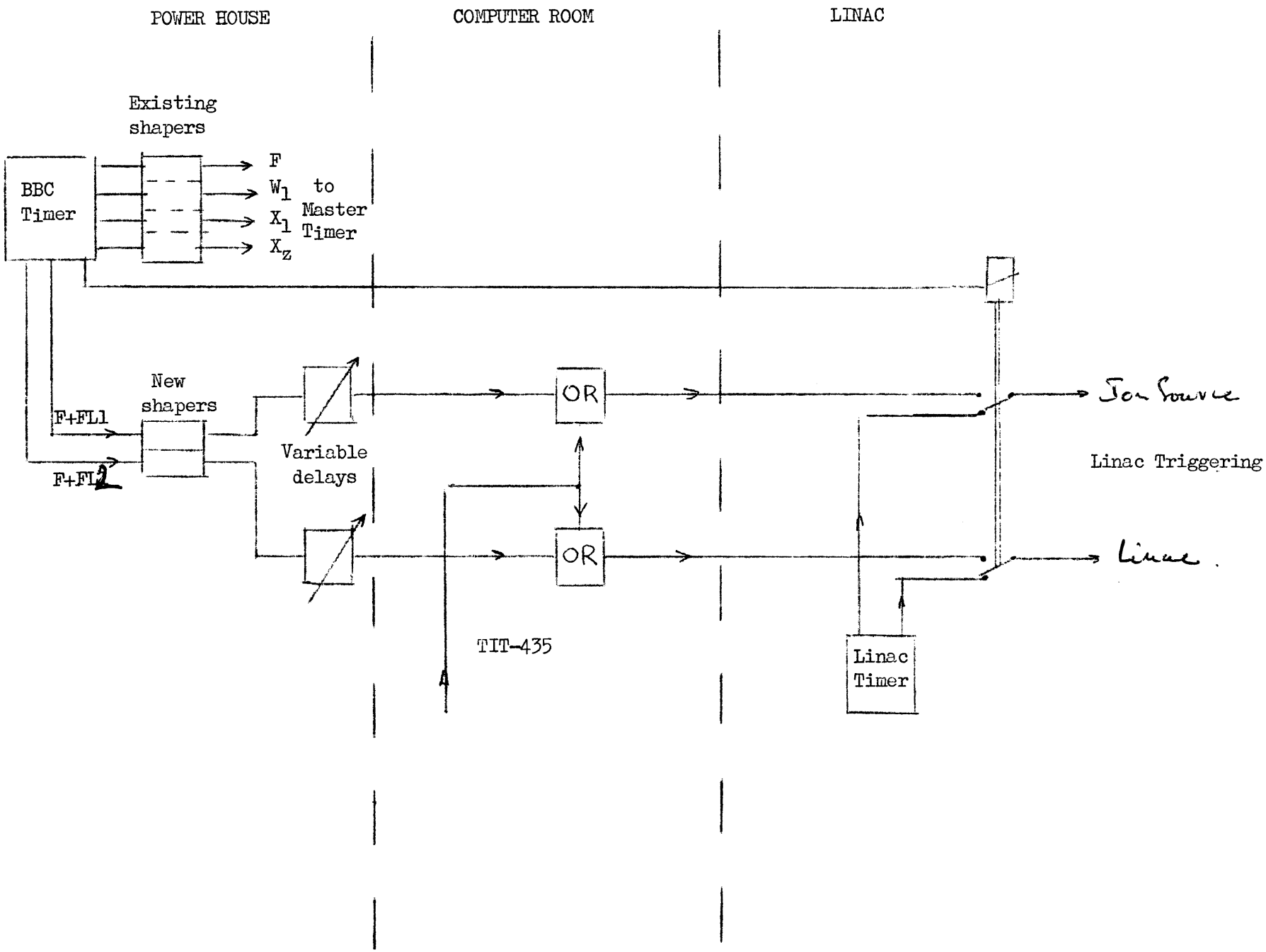
4.5. Four coaxial cables have to be installed between the MPS desk and the Computer Room.

A.Cheretakis.

Distribution: (open)

P.S. Parameter Committee members
Machine Group Committee members
U.Kracht
P.Mulder
B.Sagnell
J.B.Sharp

/jdw


POWER HOUSE
COMPUTER ROOM
LINAC
Existing shapers
BBC Timer
F
W1
X1
X2
to Master Timer
New shapers
F+FL1
F+FL2
Variable delays
OR
OR
Ion Source
Linac Triggering
Linac
TIT-435
Linac Timer