PROPOSED BLOCK DIAGRAM OF KICK PARAMETER SELECTION / C-EJECTION

drawings 374-000-3, 374-100-3

R. Bossart

Reference is made to the design study TN-49, fig. 7.8. The plug-in unit C-Ejection is housed in the chassis Kick Parameter Selection. The plug-in unit C-Ejection defines the instant of ejection by means of a preset scaler counting down the 10 KHz C-train. The preset pulse produced by the unit is called C-Ejection. The instant of C-Ejection can be selected over a range of 10 seconds after the beginning of the acceleration cycle.

There are pre- and post-pulse units locked to the C-Ejection master-pulse. The principle of master-pre- and post-pulses has been described in the internal report FES-67-6. The master-pulse C-Ejection, synchronized by RF, times the excitation of the kicker magnet; C pre-pulses locked to it trigger the two septum magnets; other C pre-pulse units switch on and off all high voltage power supplies of the magnets and the movement of the mobile septum magnet. The system of master-pre- and post-pulses simplifies greatly the operation of the kicker and septum magnets. The plug-in unit C-Ejection produces a gated RF-train to drive the Bunch Selector (see TN-49, fig. 7.7) and the RF pre- and post-pulse units used for the beam observation.

The plug-in unit C-Ejection consists of (see diagram 374-000-3):

- a preselector A of 5 decades, which permits local or remote preselection of a number a between 00 000 and 99 999. The supply voltage is switched either to the local or remote digiswitches M 031;

- a counter C of 5 decades SN7490N counting the 10 KHz C-train;

- a comparator B of 5 gates SN7400N and 10 open collector gates SN7403N, which compare the contents of counter C with the preselection A;

- two coincidence gates H and M, which are opened if the counter equals the preselected value. Gate M is opened during the count-down by the C-train, sorting out the master-pulse C-Ejection via gate N and blocking oscillator BO. Gate H is opened at the beginning of the prerun, which arms the C-prepulse units;

- a one shot OS 1 with a flash lamp, which signals optically, that the pulse C-Ejection has been sorted out of the unit;

- a control flip-flop O (SN7472N) to control the C-train by gate D. The gate is opened by the Start pulse and closed by the C-Ejection pulse. The Start pulse is generated by the power supply of the accelerator at the beginning of the acceleration cycle.

- a free running oscillator OSC of 1 ... 1,5 MHz for the prerun. The prerun is used to arm the C-prepulse units to be locked to the master pulse C-Ejection. The oscillator shall be constructed of transistors as an astable multivibrator.

- a control flip-flop G (SN7472N) to control the prerun of the counter C. The prerun takes place 100 ms before the acceleration cycle starts. The prerun of the C-decades is started by the Reset signal and stopped after 10^5 pulses by the overflow of counter C. The Reset signal is derived from the C-train by a special preset counter called Stop Cycle Simulated (see TN-49, fig. 7.5).

- a control flip-flop I (SN7472N) to gate 10^5-a pulses by gate K to the C-prepulse units, where "a" means the preselected number of the digiswitches A. The prerun of 10^5-a pulses arms the C-prepulse units to be locked to the master-pulse C-ejection. The prerun is started by the coincidence signal of gate H and stopped by the overflow signal from counter C.

- a one shot OS 2, which sets the counter C to 00 001 before the countdown of the C-train starts.

- two synchronization flip-flops P and T (SN7472N) to start the RF-train by RF-30 immediately after the C-Ejection pulse is generated. The RF-train is gated out of the RF by gate Z.

- a parallel counting RF counter of 14 flip-flops SN7472N grouped in 3 decades V and 2 flip-flops W to close gate Z after 1999 RF-pulses have passed it. The first thousand pulses are used for the countdown of the RF-prepulse units, the second thousand pulses for the countdown of the RF-postpulse units. The RF-train is transmitted to the Bunch Selector too, to initiate ejection after 1000 + d pulses, if d means the number of the first bunch to be ejected.

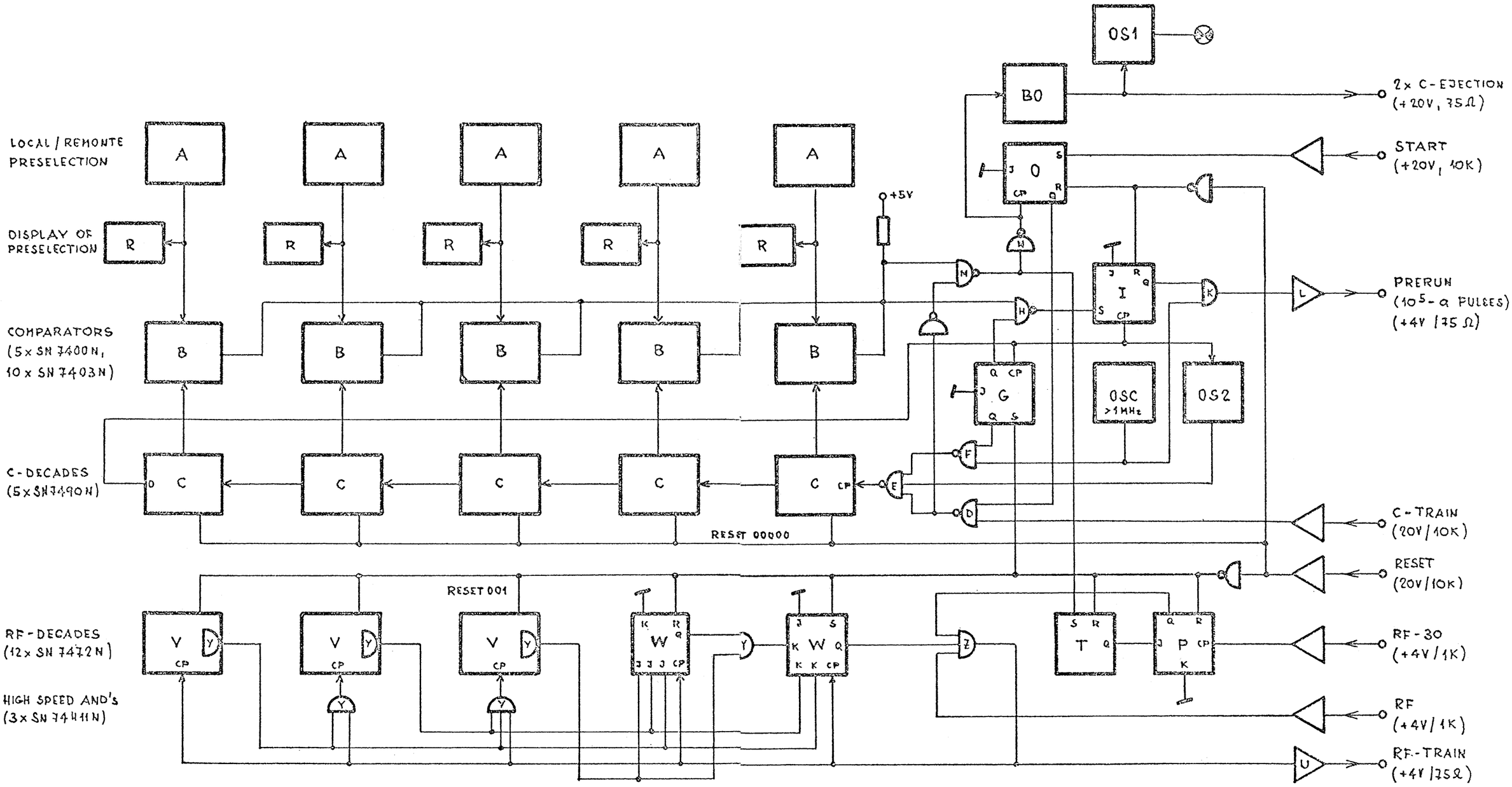
- a Nixie display of the preselected number of C-pulses for C-Ejection.

The input/output amplifiers of the plug-in unit shall be located in the plug-in unit itself to protect the integrated circuits from over-voltages during plugging in and out the unit. It is desirable that the amplifiers do not change the polarity of the signals. The detailed circuits of C-input amplifier, RF-input amplifier and RF-output amplifier are proposed in drawing 374-100-3.

The input/output characteristics of the C-Ejection plug-in unit shall be :

Input signal	Amplitude	Pulse width	Input impedance
C-train	+ 20 V	1 µs	10 K
Reset	+ 20 V	1 µs	10 K
Start	+ 20 V	1 µs	10 K
RF-30	+ 4 V	80 ns	1 K
RF	+ 4 V	80 ns	1 K

Output signal	Amplitude	Pulse width	Load impedance
C-Ejection	+ 20 V	1 µs	2 × 75Ω
Prerun	+ 4 V	0,4 µs	75Ω
RF-train	+ 4 V	80 ns	75Ω



Nombre de pièces			Désignation	Pos.	Matière	Observations
III	II	I				

Mod.	Date	Nom	Tolérances générales
A			de à ±
B			de à ±
C			de à ±

Ensemble | S. Ensemble

Dessiné	20.10.69	U.S.
Contrôlé	22.10.69	K. [illegible]
Vu		

Echelle

Remplace

Remplacé par

KICK PARAMETER SELECTION
PROPOSED C-EJECTION

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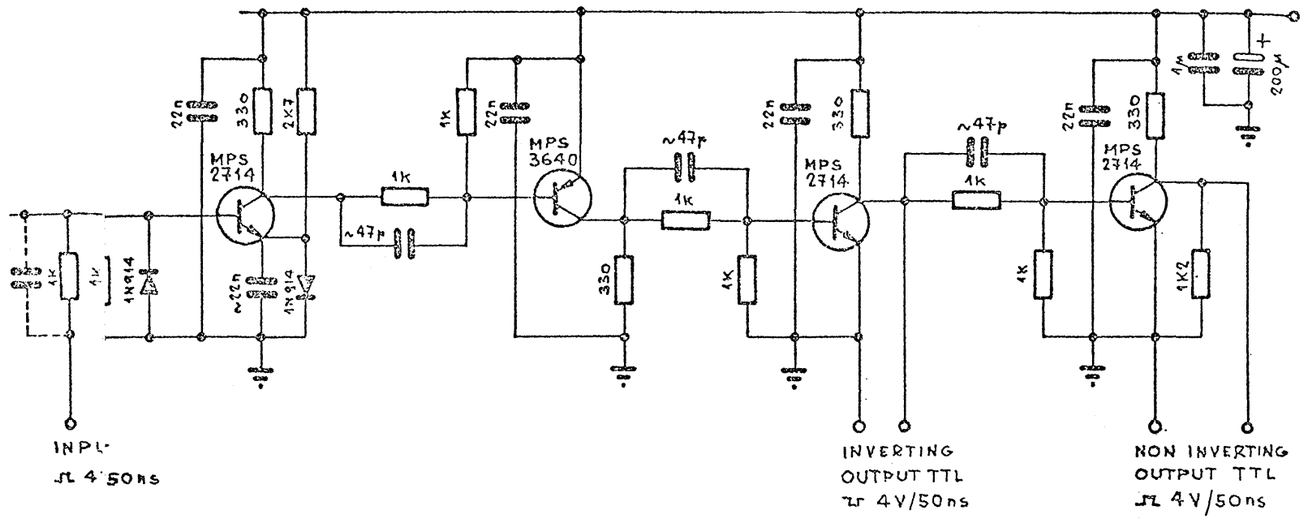
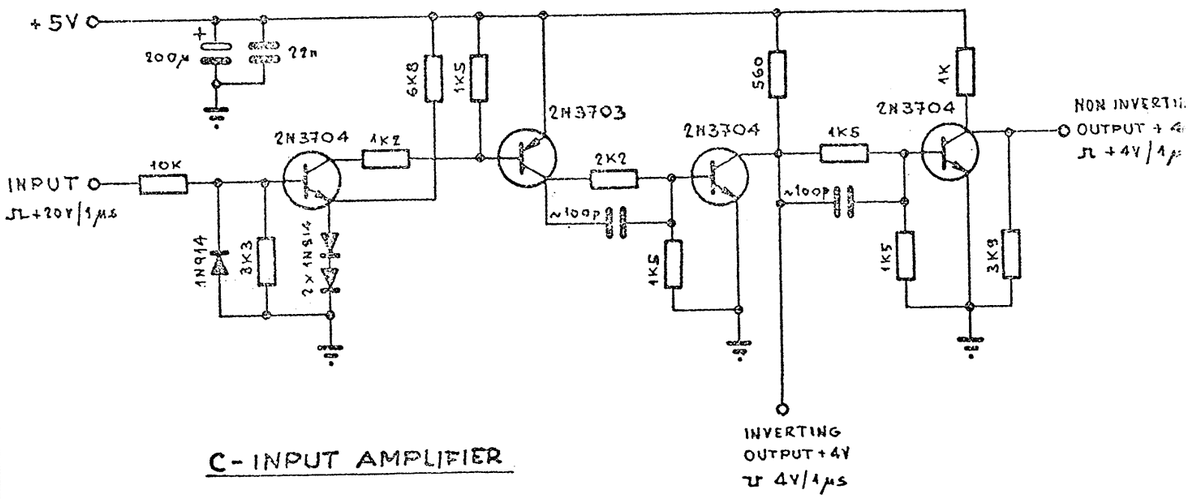
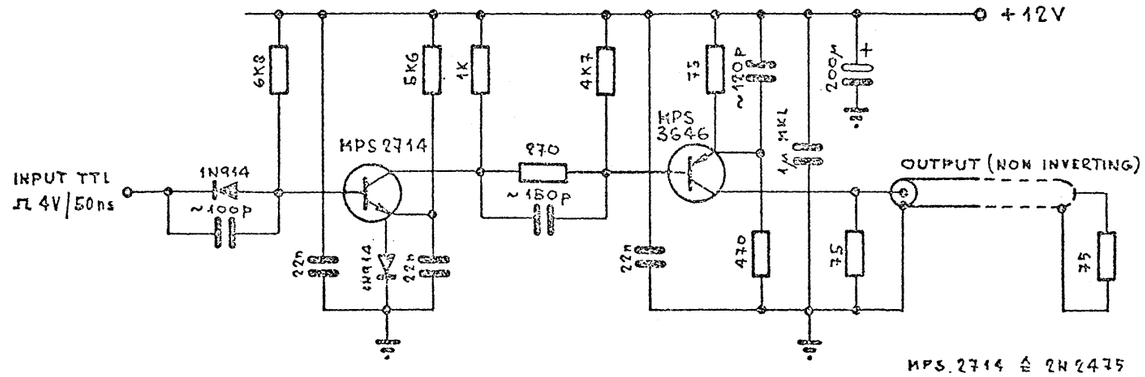


RF - INPUT AMPLIFIER



C - INPUT AMPLIFIER



RF - OUTPUT AMPLIFIER

Nombre de pièces			Désignation	Pos.	Matière	Observations
III	II	I			-	

Mod.	Date	Nom	Tolérances générales
A			de à ±
B			de à ±
C			de à ±

Ensemble | S. Ensemble

Echelle

KICK PARAMETER SELECTION

PROPOSED INPUT/OUTPUT AMPLIFIER

Dessiné	21.10.69	U. B.
Contrôlé	22.10.69	R. B.
Vu		

Remplace

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