Such an internet service was created and is accessible now on web page www.amiz.ajaksoft.com.pl (Fig.1). Information concerning dust monitor AMIZ-2004G and its basic technical data are now given in the service. Description of the dust monitoring system, instruction how to operate the program for acquisition of measured data, operating instruction of the monitor AMIZ-2004G, and leaflets of the system can also be found there.

The main task of the created service, apart from the presentation of the dust monitor AMIZ-2004G, is the presentation of measured results from already existing measuring stations. Three measuring stations are put presently into operation. Two of them are located in the neighborhood of Kielce (one at Ostrowiec Świętokrzyski, the other at Starachowice). The third station is located at Rewa near Gdańsk. Measured data from two stations in the neighborhood of Kielce are presented on the web page. The data are: airborne dust concentration, air temperature and pressure and relative humidity measured by the stations. Example diagrams with measured data are shown in Fig.2. The diagrams presented in the page are generated by the program servicing AMIZ-2004G and then they are sent to a server. The diagrams show the real dust concentration measured by two stations.

Creation of internet service presenting an airborne dust monitor is necessary also from marketing reasons – easiness to reach potential clients. Such a service enables to show that such monitors are already in operation. This is also the first step in the development of internet page database containing measuring results of all installed monitors.

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FIBER-OPTIC CONTROL SYSTEM FOR LAE 10 ACCELERATOR AND PULSE RADIOLYSIS EXPERIMENTAL SET

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The LAE 10 accelerator is used in nanosecond pulse radiolysis experiments as a source of 10 ns pulses of high energy electrons [1-4]. The accelerator system was elaborated in the years 1991-1993 [5]. Block diagram of the optic trigger system with later modifications is presented in Fig.1. Inseparable connections of the optical fiber marrow with E/O and O/E converters (executed in welding technique) ensured a high stability of the optical parameters at a very long time. The preparation of connections needed adoption of expensive instrumentation from an optoelectronic laboratory in Warsaw.

However, time jitter of the pulses of electron delivered by the accelerator was too big for pulse radiolysis experiments. The total accelerator jitter

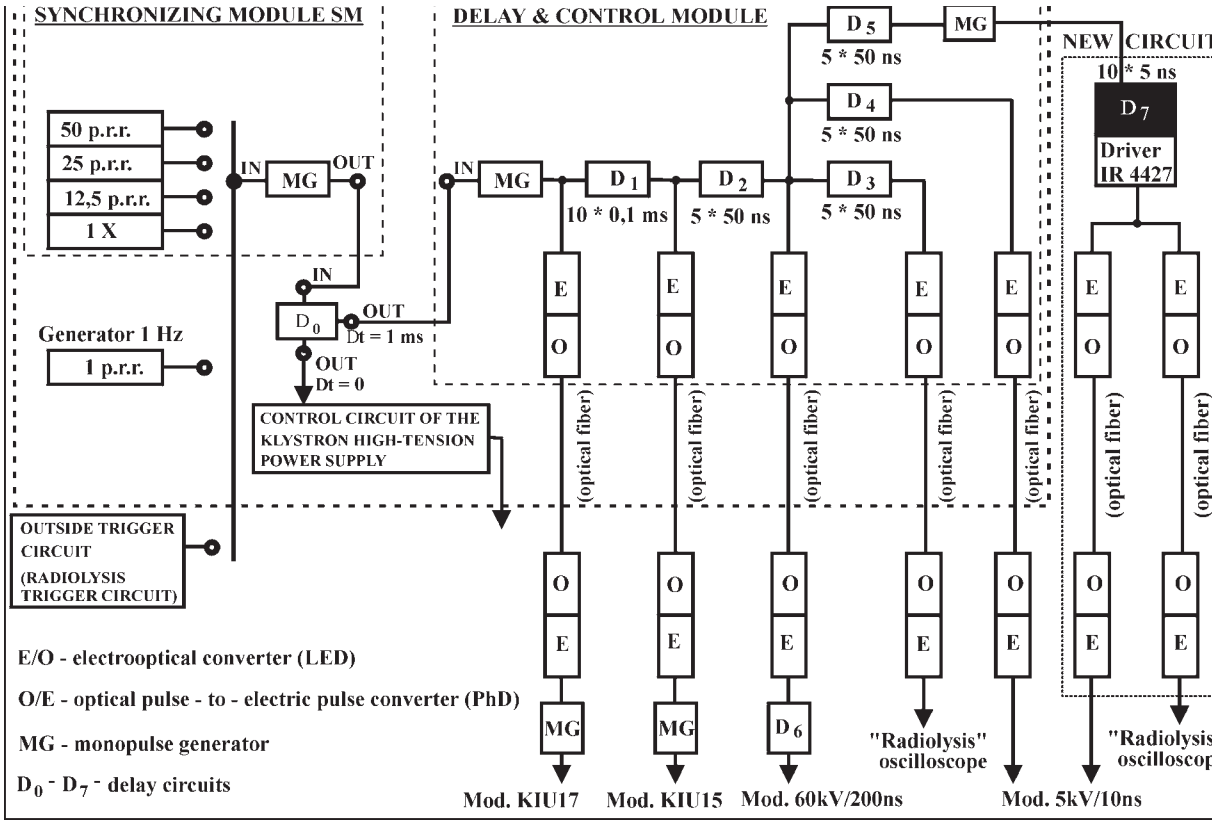

Fig.1. Timing and trigger circuits of the LAE 10 accelerator.

is practically the same as the jitter of a nanosecond modulator (5 kV/10 ns) of the electron gun grid [6]. A detailed consideration of the problem revealed out during analyzing a light adjustment procedure (after each change of wavelength), it requires triggering all accelerator pulse devices except the nano-

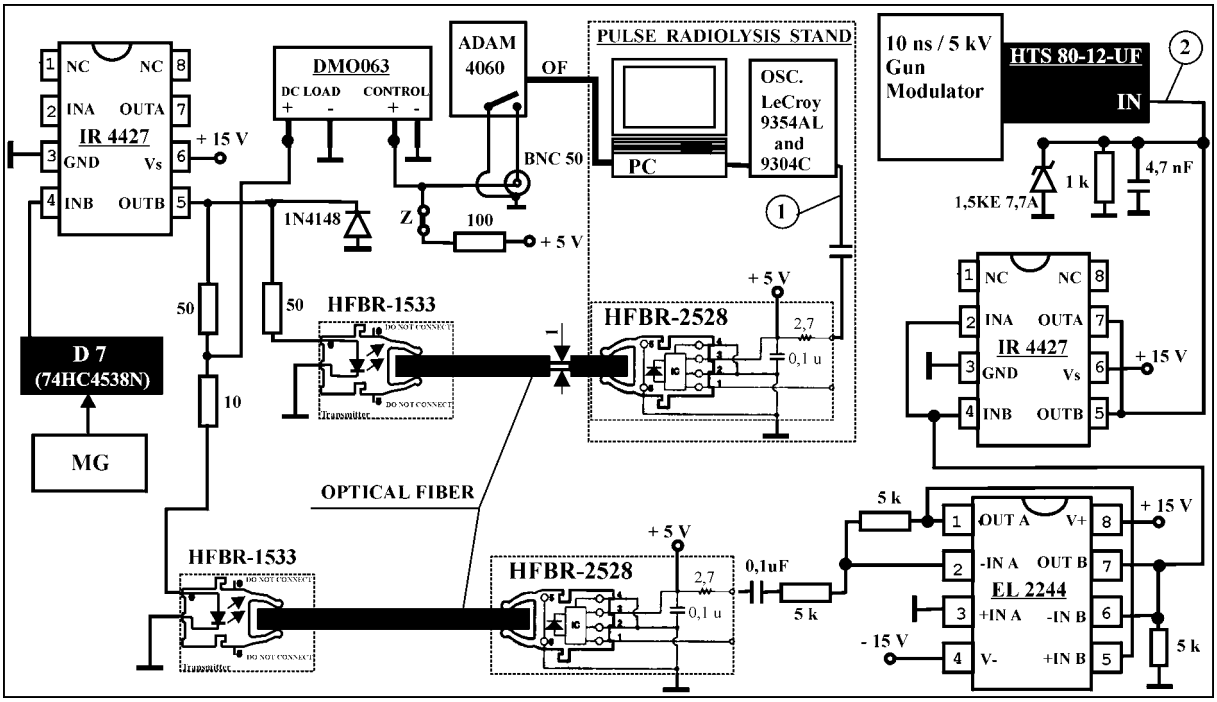

Fig.2. Simplified scheme of the fiber-optic trigger circuits for the nanosecond electron gun modulator and radiolysis oscilloscopes.

that the applied electronic circuits in trigger line of the nanosecond modulator and in trigger line of the oscilloscopes have too long pulse leading edges (turn-on rise times). The pulse rise time is about 100 ns. The "speed" of thyristors, BTP128 type (commercially available), determined the jitter level. Completely new trigger lines were designed and realized. The new trigger lines of jitter level should ensure less than or equal to ±5 ns.

Figure 2 shows the simplified schematic drawing of the new trigger circuits with fiber-optic channels of the nanosecond modulator and radiolysis oscilloscopes. Highly speedy electronic subassemblies and E/O and O/E converters (HFBR-1533 "transmitters" and HFBR-2528 "receivers" made by Hewlett Packard) were applied in the trigger lines. A nylon optical fiber which to get along with the converters has a diameter of 1 mm. Advantages of the new circuits are the following:

- rise time of each subassembly is repeatedly lower,
- low cost of subassemblies and elements,
- connections HFBR-1533 "transmitters" and HFBR-2528 "receivers" with the nylon optical fiber are possible (in own range) without very expensive instrumentation,
- precise and repeated shift possibility on the time axis (as about 5 ns) to allow on adjustment pulse of the nanosecond modulator in proportion to anode modulator (60 kV/200 ns) of the gun. Digital potentiometer (with decimal controller) 3683 type Bourns firm was applied in D7 delay circuit [7] to achieve precise adjustment.

Another interesting feature of the accelerator is the possibility of the control of pulse pedestal [8] while running the experiment. This can be carried second modulator of the accelerator electron gun grid. Triggered pulse of the HFBR-1533 "transmitter" in the trigger line of the nanosecond modulator is shorted to "ground" by an electronic relay, DMO063 type. The short-circuit is executed on the

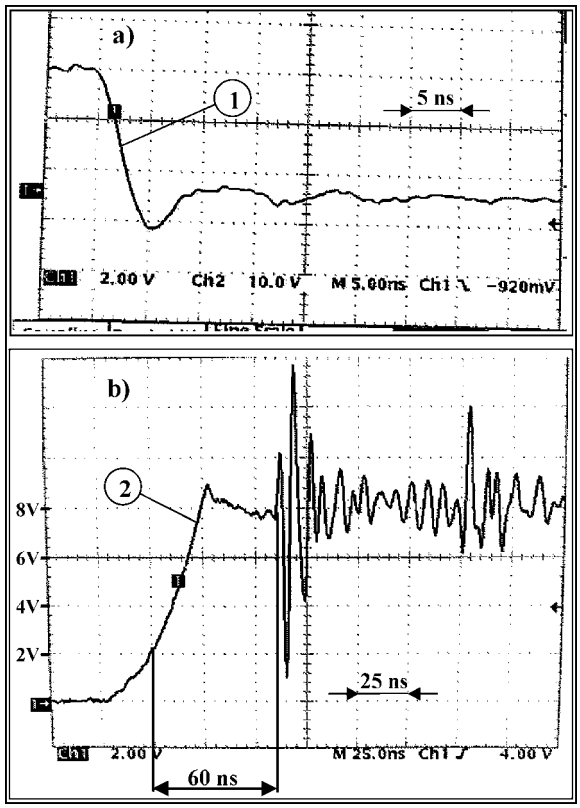

Fig.3. Pulse leading edges in selected places of fiber-optic trigger circuits.

signal from the pulse radiolysis experimental set. The signal is transfer by the optical fiber "FO" and Adam-4060 couple module (Fig.2).

Figure 3 shows the pulse leading edges in selected places (see Fig.2) of the new trigger circuits. The pulse leading edges was recorded by a digital Tektronix oscilloscope, TDS620 type, and the oscillograms were taken by QV-100 Casio digital camera and computer processed. We can state that the pulses on the output of the HFBR-2528 "receiver" (Fig. 3a) can be obtained with rise time less than 5 ns. It was a significant achievement because own rise time of the HFBR-2528 receiver is 12 ns typically. Radiolysis oscilloscopes can be, therefore triggered with jitter below 1 ns. Trigger circuit of the nanosecond modulator is more complicated. Additional electronic subassemblies and elements are inserted between the output of the HFBR-2528 "receiver" and the input HTS 80-12-UF high voltage transistor switch of the nanosecond modulator. The amplifier built-up, inter alia, from the EL2244 integrated circuit and IR4427 driver are the subassemblies. Resistor (1 kΩ), capacitor (4.7 nF – relatively big capacity in this case) and 1.5KE7.7A diode to overvoltage protection are the elements set up in parallel to the switch input. It was necessary to reduce – to value less than noise--margin – the amplitude of the disturbing pulse on the input of the HTS 80-12-UF switch. Anode modulator (60 kV/200 ns) of the accelerator gun [6] is the source of the disturbing pulse. So, therefore considerable reduction occurred of the pulse rate-of-rise from about 1 V/ns on the output of

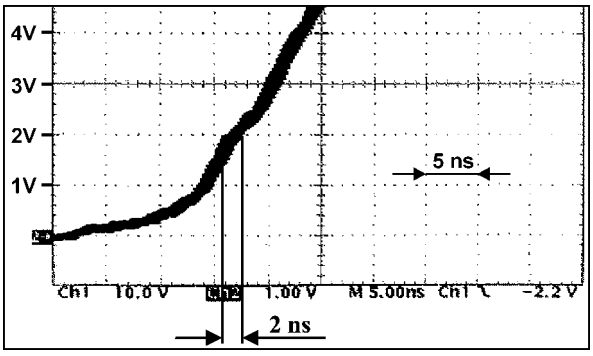

Fig.4. Part of 30 pulse leading edges.

the HFBR-2528 receiver to about 0.1 V/ns on the input of the HTS 80-12-UF switch. Delay time of the switch is 60 ns with an effect from the moment of time in which the voltage on the input of the switch achieved an adequate value. Amplitude of the trigger pulse ought to range from 2 to 10 V. The start action of the switch can be recognized by the occurrence of characteristic pulse ripple (Fig.3b).

Essential fragments of the successive 30 pulses on the HTS 80-12-UF switch input is shown in Fig.4. We can state that jitter of the trigger line of the nanosecond modulator is not more than 2 ns even for the most disadvantageous case *i.e.* for least rate-of-rise the voltage range from 2 to 3 V. Jitter of the nanosecond modulator is practically the same because own jitter of the switch is only 100 ps.

A series of accelerator pulses in radiolysis experiments as a rule is less than or equal to 10 pulses. In conclusion, we can state that the new trigger lines assure the operation jitter of the LAE 10 accelerator less than 5 ns. Successive results from numerous recent pulse radiolysis experiments confirm this conclusion.

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