ACCURACY INCREASE AND SIMPLIFICATION OF PARALLEL ANALOG-TO-DIGITAL CODER MEANS

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The known at present time methods of "voltage-code" converting significantly differ from each other with the converting rate, hardware implementation difficulty and potential accuracy. Undoubted leaders in the first two categories appear analog-to-digital coders (ADC). Thanks to the simultaneous work of $2^n - 1$ equalized comparator units paralleled to the source of home signal, the base voltage of which is formed by 2^n resistors, the parallel ADC are the quickest. For example, one-of-eight decoder MAX 104 allows getting 1 billion indications per second.

But a disadvantage of a parallel ADC is a high complexity and, as the consequence of it, a high price (hundreds of US dollars) and a considerable power intake (about 4 W); the number of comparator units redoubling with the ADC code length (and it means its accuracy) increase. When the register length is more than 6-8 bits, the scheme becomes extremely bulky. This is what limits the use of parallel ADC in practice.

The research carried out by the authors showed that one of the most optimal ways of accuracy increase and simplification of parallel ADC means, which are used for bipolar signals conversion, can serve introducing a sense and negative voltage inversion unit, completing activity of sensing (the polarity) of home signal voltage, creation of voltage module of home signal and its following relaying with a unitary ratio of transmission, into the ADC composition scheme

Introducing the offered unit into the composition of one-of- *n* ADC means for analog-to-digital processing of bipolar signals and negative polarity signals is equal to:

a) output pattern increase by one digit on account of introducing an additional bit (the polarity sign code), and the ADC accuracy increase being meant by it without saying;
b) simplification of ADC means on account of negative voltage inversion, that will allow reducing ADC code length from *n* to (*n*-1), and it means - reducing the number of comparators twice as much;
c) reducing power consumption (in terms of one digit of a parallel ADC) practically twice as much on account of the means' simplification.

The article is admitted to the International Scientific Conference " Information delivery and processing problems "; 2007, India, Goa, 2007, March 1-11; came to the editorial office on 11.01.07

DEEP ELECTROCHEMICAL 2D BARCODE MARKING OF GOODS

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The international standard of quality system management ISO 9001:2000 requires carrying out the identification of each product in every technological cycle. Linear barcodes, which initially were considered to have high quality contrast and denotation, are put on a paper basis or on labels that can result in further loss of information. Such marking allows putting not more than 30 figures, that not always let code the necessary volume of information. All this has led to the appearance of bi-dimensional (2D) notation, which allows to code hundreds times more information; is meant for direct drawing on products; has greater information security due to compaction, duplication and the system of mistake correction of Read-Solomon.

The possibility of electronic sensing under any angle, the possibility to read at 20% contrast of marking signs relative to the surface (for a linear bar-code it is required not less than 80-90% of contrast) refer to the advantages of matrix marking, Data Matrix, for example; the possibility to dimensional scaling and distant reading are available. In a square marking sized some millimeters only, up to 2335 alphanumeric

signs can be put. Actually, it is a portable database.

One of effective conductive surfaces' marking methods is electrochemical marking (ECM). Typical installations of ECM use solid tool-electrodes (TE) and a data entry screen with hollows in the image of the picture being marked, there being no electrolytic flow canal; the process is carried out by means of electrolytic damping of a porous layer. It limits the marking depth. Besides, such screens allow to apply a limited number of markings, require special materials and printers or using photolithographic methods for stamping.

The installations having the minimized and equal interelectrode-gap gage (IEG), along the whole surface and providing the conditions for the uniform electrolytic flow allow actualizing the ECM advantages to the full extent. The useful area of the developed by us TE for ECM with matrix notation sized 10x10 elements is a flat die made by the ends of isolated copper conductors of 0,35 mm diameter which are disposed in the form of a rectangular screen. The IEG is 0,1-0,2 mm, the electrolyte being prepared on the basis of sodium chloride or sodium nitrate.

We also developed a method of TE units' commutations with photo-elements' use which doesn't contain mechanical circuit changers and without using complex programming devices. Every TE unit was connected with a photo-resistance on a flat panel through a reinforcing agent, and the disposition of the photo-resistances corresponding to every TE unit. The treatment was carried out by direct or alternate (for blackening) current. To do it a light image, in correspondence to which the commutation and current passage through TE units was carried out, was projected on the photo-elements' die through a light-sensitive film or a photomask on the photocell matrix. The signs' depth was 0,2 mm at the processing time of 40 sec., that is sufficiently higher than the mask methods of ECM.

The article is admitted to the International Scientific Conference " Modern High Technologies "; Egypt, Hurgada, February, 21-28, 2007; came to the editorial office on 11.01.07