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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS
ELECTRONICS AND ELECTRICAL ENGINEERING
No. 27

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ELECTRONICS AND ELECTRICAL ENGINEERING

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This serial publication contains abstracts of articles from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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USSR

UDC 621.375.7:523.164

PARAMETRIC AMPLIFIERS FOR RADIO ASTRONOMY

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976 pp 1464-1467 manuscript received 13 Oct 75

KANEVSKIY, B. Z., KOROGOD, V. V. and STRUKOV, I. A., Space Research Institute, Academy of Sciences USSR

[Russian abstract provided by the source]

[Text] The paper gives research results and characteristics of parametric amplifiers on wavelengths of $\lambda = 18$ cm and $\lambda = 1.35$ cm that are used in radio astronomy. Preliminary results are given from a study of a system made up of a degenerate paramp and a frequency doubler and investigation of its use in a radiometer. Figures 3; tables 1; references 3: 1 Russian, 2 Western.

USSR

UDC 621.396.61

DESIGN OF WIDE-BAND MICROWAVE POWER AMPLIFIERS WITH COMMON BASE

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 56-60 manuscript received 11 May 75

PETROV, B. YE. and REZNEV, A. A.

[Abstract] An analytical method is proposed for designing output and input matching circuits for transistorized microwave power amplifiers with common base operating over a frequency band of about an octave. The resultant relations can be used to compare power amplifiers with passband reaching to the cutoff frequency of the transistor and common-emitter amplifiers. A common-base power amplifier covering a frequency band of 0.9-1.8 GHz is designed, constructed and experimentally studied. Curves are given for the frequency dependence of power gain, collector current and efficiency. There is little change in the measured quantities throughout the frequency band, and the theoretical and experimental values of power gain show close agreement. Figures 5; references 8: 6 Russian, 2 Western.

USSR

UDC 621.396.61

METHODS OF CONSTRUCTING AMPLIFIERS FOR UNIPOLAR-TRANSISTOR RADIO TRANSMITTERS

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 47-55 manuscript received
11 Dec 75

SHAKHGIL'DYAN, V. V., ROZOV, V. M. and KOZYREV, V. B.

[Abstract] A comparative evaluation of different methods of making amplifiers for transistorized transmitters with single-band modulation for a power of 1 kW or more in the 1.5-30 MHz range. The techniques examined include methods of automatic regulation of the operating conditions of transistors, the method of dephasing, Doherty's method (W. H. Doherty, A new efficiency power amplifier for modulated waves, "Proc. IRE," 1936, No 24), the method of quantizing the single-band modulated signal, and the method of separate amplification of the envelope and FM component of the SB modulated signal. It is shown that the most promising method at the present time is separate amplification of the signal components. Figures 5; references 18: 14 Russian, 4 Western.

Antennas

USSR

UDC 621.396.67

MEASUREMENT IN THE FRESNEL ZONE OF THE RADIATION PATTERN OF ANTENNA ARRAYS BY THE FOCUSING METHOD

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 35-40 manuscript received 10 Sep 74

AYZENBERG, A. G.

[Abstract] In connection with the wide use of large-aperture antenna arrays, the boundary of the far zone of which is found at a very large distance from the antenna, interest has been increased in methods for determining the radiation pattern and the amplification factor of the antenna by the results of measurements in the near zone. One of them is the focusing method which makes it possible to reproduce near the antenna the field of its far zone and to determine the external characteristics of the antenna by a direct measurement. The present paper considers the general form of phase correction which makes it possible to reproduce in the Fresnel zone an arbitrary part of the radiation pattern of the antenna. The angular dimensions of the reproducible part of the pattern are determined and the limitations on the minimum permissible distances from the antenna to the point of observation are specified. The author thanks A. R. Vol'pert for discussion of the paper and for valuable advice. Figures 2; references 2: 1 Russian, 1 Western.

USSR

UDC 621.396.677.67

USING HORIZONTAL DIPOLES TO MEASURE ANGLES OF ARRIVAL OF RADIO WAVES IN THE DEKAMETER BAND

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 35-40 manuscript received 30 May 74

LUGANIN, V. A. and VOROB'YEVA, L. P.

[Abstract] A technique is proposed for determining angles of arrival of radio waves in the vertical plane in the dekameter wave band by using antenna systems comprised of wide-band horizontal dipoles 1 m in diameter with 8-m arms and wave impedance of 300Ω arranged to form two large and two small bases. The angles of arrival are determined by measuring the phase difference of signals received by the antennas of the different bases which are connected alternately or simultaneously to a two-channel receiver or receivers on each ionospheric probing frequency. It is shown that angles of inclination of signals can be determined in the range of $\approx 5-85^\circ$ and azimuths of $\approx 30^\circ$ by using two orthogonal two-base systems with phase comparison. Mutual coupling between the short-base antennas appreciably limits the possibility of wide-range operation of the direction-finding system in the case where the input impedances of the receivers are not matched to the feeder lines (with simultaneous operation of bases); in base-switching, the antennas are unloaded or

connected to arbitrary loads. In the case where the receiver inputs are matched to the antenna feeders and base-switching is employed, the harmful effect of mutual coupling on the phase properties of the system is considerably alleviated when the load resistance equals the wave impedance. Short bases with different antenna heights or with the same heights when transverse spacing is shorter than 7 m cannot be effectively used for indication of phase difference. When a small base is used with longitudinal spacing of 15 m and heightwise spacing of 15 m, the maximum error of the bearing for a two-base system with phase comparison when load resistance is equal to wave impedance is no more than 1°. Figures 3; tables 1; references 6: 5 Russian, 1 Western.

USSR

UDC 621.396.679:621.372.3

ELECTRIC STRENGTH OF FEEDER LINES

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 27-30 manuscript received 2 Jun 76

BELOUSOV, S. P., GOVORKOV, I. T., KOMISSAROV, V. I. and KUZNETSOV, V. D.,

[Abstract] An examination is made of flash discharge on multiconductor high-power feeder lines for transmitters operating in the dekameter band. It is shown that the electric field intensity on the surface of a conductor at which flash discharge can occur due to contact by foreign objects (birds, insects, dust, leaves, etc.) depends considerably on the design of the conductor, which determines the structure of the field close to its surface. For an isolated 6-mm wire flash discharge arises at a field intensity of 4.3 kV/cm, for a cylinder of several 6-mm wires -- 2-3 kV/cm, and for a 45-mm tubular conductor -- 1.1 kV/cm. While the field intensity at which spontaneous flash discharge occurs is considerably higher than that due to contact with foreign objects, experience has shown that operation at higher powers is feasible if due precautions are taken to protect the feeder lines. In addition, the minimum field intensity for spontaneous flash discharge depends very little on conductor design. The power that can be transmitted safe from spontaneous flash discharge is 7-8 times the safe value for preventing flash discharge from contact with foreign objects. Figures 1; tables 2; references 2 Russian.

EAST GERMANY

CONSIDERATIONS ON THE LOCALIZATION DIRECTIVITY IN PULSE OPERATION

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 9, 1976 pp
328-331 manuscript received 29 Oct 75

KUHRT, R., Berlin

[Abstract] The author describes the equivalent circuit for the straight-line antenna propagation under monostatic operation with linear, uniformly excited antennas, the directional effect of the localization process using high-frequency pulses, and an expression for the pulse reaction of the localization process. With this expression, the starting-time functions for the localization process may be calculated, and from these functions the peak values and maximum directional effects established. In deriving the expression, use was made of a method taken from single-path directivity, comparing the direction-dependent pulse-peak values. For calculating the maximum directional effect, we require the pulse-time function as a function of the angle, measured at the output of the receiver. The signal shape significantly affects the maximum directional effect. Figures 9; references 19: 9 German, 5 Russian, and 5 Western.

USSR

TOOL FOR ACQUISITION OF KNOWLEDGE OF THE EARTH AND THE UNIVERSE

Moscow RADIO in Russian No 10, Oct 76 pp 14-16

TROITSKIY, V., corresponding member of the Academy of Sciences USSR, and
ALEKSEYEV, V., candidate of physical and mathematical sciences

[Abstract] This is the first of two articles explaining the principles of long-base radiointerferometry. Practical problems of sensitivity and resolution in radio observation of weak point sources are discussed, and it is shown that the largest steerable and fixed radiotelescopes are inadequate for certain applications in radio astronomy. The only way to overcome the limitations on resolution imposed by practical antenna size is to use spaced antennas as radio interferometers. Figures 1.

USSR

UDC 21.396.4

SELECTING PARAMETERS OF EQUIPMENT FOR DIVERSITY RECEPTION OF FM SIGNALS

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 10-17 manuscript received 16 Jul 74

BYKHOVSKIY, M. A.

[Abstract] The article is a continuation of the paper published in "Elektrosvyaz'," No 4, 1976: "Principles of Designing Devices for Diversity Reception of FM Signals." Expressions are derived for calculating phasing modules in FM diversity reception equipment -- error probability and distribution of noise power in the AF channel. It is shown that when $N \leq 8$ the filtration band in the phasing module can be fairly broad (commensurate with the width of the group spectrum frequency band) for low energy losses. This simplifies the coherent adder and relaxes requirements for modulator instability. If $D \leq 0.6$ and $N \leq 16$, the interference immunity of reception can be made high when parameters are appropriately selected. This simplifies the coherent demodulator. Calculations show that the "Akkord" device with phase feedback circuit has considerably better interference immunity than with FM-PM converter and frequency discriminator when parameters are properly chosen. The calculated energy gain is 4-5 dB. Figures 5; tables 1; references 7 Russian.

USSR

UDC 621.39:621.376.56

TO A CALCULATION OF THE PRINCIPAL PARAMETERS OF A CYCLIC SYNCHRONIZATION CHANNEL

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 84-87 manuscript received 17 Feb 76; after completion, 28 Apr 76

KALABEK'YANTS, N. E.

[Abstract] A procedure is proposed for analysis of the principal parameters of a cyclic synchronization channel with an arbitrarily selected structure of synchrocombination and distribution of messages in the channels. All the 256 possible combinations of the 8-digit code most frequently used for synchronizing signals were calculated on an electronic computer. Two norms of the distribution functions of messages were considered: normal (truncated normal with a relative level of overload $U_{01}/\sigma=4$) and exponential with the same level of overload. A simple arithmetical code was used. The results of the calculations are shown in a table (the form of the synchrogroups is given in the sexadecimal number system). Figures 2; tables 1; references 1 Russian.

USSR

UDC 621.315

INCREASING THE EFFICIENCY OF UTILIZATION OF OVERHEAD LINES

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 22-26 manuscript received 17 Mar 76

VOLNOVA, N. P. and ZHITKEVICH, R. G.

[Abstract] A design technique is outlined for determining the feasibility of multiplexing circuits in overhead communication lines in the spectrum above 150 kHz, and recommendations are made on placement of repeaters for the V-12-2D auxiliary 12-channel system. The V-12-2D equipment for the frequency band above 150 kHz is derived from existing OV-12-2 equipment by making certain circuit changes. It is shown that nonferrous metal circuits should preferably be multiplexed on intrazone sections with a length of 100-200 km. Extending the range of transmitted frequencies to 300-350 kHz on existing overhead lines makes it possible to multiplex one nonferrous metal circuit with a 12-channel system without changing the transposition arrangement or matching equipment. The transposition has to be changed when two or more nonferrous metal circuits are multiplexed simultaneously in this spectrum. The considerable reduction in atmospheric interference with increasing frequency improves the signal-to-noise ratio. Tables 3; references 2 Russian.

USSR

UDC 621.317.6.621.376.56

AN INSTRUMENT FOR MEASURING IMMUNITY TO QUANTIZATION NOISES IN THE CHANNELS OF SYSTEMS WITH PULSE CODE MODULATION

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 68-72 manuscript received 21 Jul 75

NIKIFOROV, N. P., PETROV, V. I., SOLOV'YEVA, G. G. and SHPIGEL', A. R.

[Russian abstract provided by the source]

[Text] An examination is made of the particulars of measuring immunity to quantization noises in PCM systems. The paper gives a block diagram of a digital meter with automatic balancing of the measured quantity and the design idiosyncrasies of certain components are examined. Figures 4; references 9: 5 Russian, 4 Western.

USSR

UDC 621.376.56

PARAMETERS OF HIGHER-ORDER DIGITAL TRANSMISSION SYSTEMS

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 2-9 manuscript received 25 Feb 75

GOLUBEV, A. N., LEVIN, L. S. and LOPUSHNYAN, YU. G.

[Abstract] A comparison is made of the most important parameters of digital transmission systems with unilateral (positive) pulse stuffing and a secondary digital transmission system developed in the Soviet Union with bilateral (negative) pulse stuffing. It is shown that systems with bilateral stuffing are superior to those with unilateral stuffing in interference immunity, feasibility of synchronous operation, resistance to "multiplication" of interruptions in cyclic synchronization, efficient utilization of throughput, permissible instability of clock frequencies of the digital flows to be connected, time deviations introduced by connecting equipment and the total volume of equipment. Figures 5; tables 1; references 9: 6 Russian, 3 Western.

USSR

UDC 621.391

CONCERNING CARRYING CAPACITY OF BINARY CHANNEL WITH INDETERMINATE PHASE DURING RAYLEIGH FADINGS

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 78-80 manuscript received 12 Oct 74; short communication, 18 Apr 75

SHLYAKHOV, I. M.

[Abstract] The problem of determining the carrying capacity of a binary channel with fading is not new. However, in the literature the carrying capacity of a binary channel is determined only for rapid fading, which does not give a complete presentation of the information possibilities of such a channel. In this short communication the carrying capacity is determined with the presence of slow fading, which makes it possible--in comparison with the results obtained for rapid fading--to evaluate the effect of the rate of fading on the carrying capacity of the channel, as well as to clarify how much use of a binary code in a channel with slow fading decreases its carrying capacity. An analysis is conducted for a channel with an indeterminate phase with the object of obtaining simpler relationships. References 3 Russian.

USSR

UDC 621.395

LOCATING A SECTION OF COMMUNICATION CHANNEL DAMAGED BY THE ACTION OF PULSE INTERFERENCE

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 17-19 manuscript received 26 Feb 75

KISELEV, L. K. and MESHKOV, A. A.

[Abstract] A method is proposed for registration of pulse interference that enables determination of the point in a communication cable where such interference arises. The technique is based on the fact that the response of the channel to pulse interference is determined by the frequency characteristics of the channel from the point where the interference arises to the point of registration. With an increase in the number of filters through which the interference passes, the amplitude of the AF channel response decreases and the duration of the transient process increases. The resultant distortion of pulse shape can be used to indicate the location of the point where pulse interference arises. A device is described that realizes the proposed method. Figures 2; references 4 Russian.

USSR

UDC 621.396.6

A METHOD OF CHECKING THE FREQUENCY CHARACTERISTICS OF COMMUNICATION CHANNELS

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 72-76 manuscript received 31 Jul 75

ZAYEDNYI, A. M., VOYNOV, S. V. and SHAMARIN, A. F.

[Abstract] A method is proposed for checking the frequency characteristics of communication channels based on using the structural properties of test signals. The technique is outlined with respect to amplitude-frequency responses, but can be extended to phase-frequency responses as well. A block diagram is given of a laboratory model of a signal-structure tester based on the proposed method. The circuit contains analog differentiators, multipliers, a divider, an adder and averagers (RC networks). All components are made with opamps and FETs. The operability of the device is completely confirmed by experiments. The process of measurement and recording can be readily automated. Figures 2; references 3 Russian.

USSR

UDC 621.396.61:621.396.67

ISOLATING CONNECTORS WITH COAXIAL RESONATORS

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 40-44 manuscript received 10 Jan 75

TEKUCHEVA, L. S.

[Abstract] The article describes isolating connectors with tunable coaxial resonators for use as filters when two transmitters of low and moderate power are operated into a single antenna in the dekameter wave band. Such resonators with helical inner conductor are intermediate between conventional filters and those made with sections of transmission line. The proposed connectors are smaller than filters with sections of line, simpler than devices with LC filters and permit resonator tuning over a wide frequency range. The spread of working frequencies of the transmitters should be at most 1 MHz. The resonator is a short-circuited section of coaxial line with the inner conductor wound into a helix. One end of the helix is free and the other is connected to the resonator housing. The length of the helix is $1/4$ the maximum working wavelength. The resonator is tuned by pulling the nonworking part of the helix into a shorting cylinder. The isolating connector is made up of two resonators connected at the output of each transmitter. The resonator outputs are joined together and connected to the antenna. Transmitter power limitation is 20 kW, which can be increased by using an organosilicon liquid to fill the resonator cavity. The technique for calculating the connector is given as well as theoretical and experimental characteristics of the TWR at the inputs of the device and the crosstalk attenuation. Figures 9; references 2 Russian.

USSR

UDC 621.396.621

TO A CALCULATION OF NOISE IMMUNITY OF RECEPTION OF TWO-STAGE RELATIVE PHASE KEYING

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 90-91 manuscript received 15 Mar 76

YERALIYEV, N. N.

[Abstract] In contemporary communication systems, two-stage relative phase keying (TRPK) is the most promising form of modulation. The noise immunity of reception of TRPK has been investigated in a number of works. However, these works consider a receiver, not allowing for intersymbol interference (ISI) resulting from the imperfectness of the characteristics of the radio channel of the receiver. As is known, calculation of noise immunity with the presence of ISI reduces to a determination of the probability error of reception of various combinations of mixing and information samples and to subsequent averaging of the probabilities with respect to a group of possible combinations. The presence of ISI leads to the appearance of an additional

phase shift between the signal and the reference oscillation which is used during detection. The present short communication determines the probability of error of TRPK with the presence of a fixed phase shift between the signal and the reference oscillation. The dependence of the probability of error on the phase shift are calculated for TRPK by the method of comparing polarities. Figures 2; references 5 Russian.

USSR

UDC 656.254.15

"DIALING" DEVICE

Moscow AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 11, 1976 pp 4-6

LIFSHITS, YA. S., chief designer, Design Bureau of Main Administration of Signaling and Communications, Ministry of Railroads

[Abstract] A "dialing" [nabor] device is described which makes it possible for a passenger using an ordinary central battery telephone set installed at a railroad station to be connected automatically through the local dial telephone exchange with such special services as the militia, fire brigade, rapid assistance, information service, and other units, for ringing each of which a separate apparatus is designated. The device was developed by the Design Bureau of the Main Administration of Signaling and Communications, Ministry of Railroads. It is planned to organize series output of the device at the Electromechanical Workshops of the Moscow Railroad. Figures 2.

USSR

UDC 666.254.15

TT-48 VOICE-FREQUENCY TELEGRAPHY EQUIPMENT

Moscow AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 11, 1976 pp 14-15

BORISOV, B. B., senior master engineer, Central Communications Office, Ministry of Railroads

[Abstract] Introduction of the TT-48 voice-frequency telegraphy equipment began two years ago on the telegraph network of the Ministry of Railroads. The TT-48 equipment is intended for secondary multiplexing of the standard tone-frequency channel of cables, overhead and radio relay communication lines. The paper considers the basic technical data concerned with this equipment and discusses its adjustment and introduction into operation at the Telegraph Section of the Central Communication Office at the Ministry of Railroads. Tables 2.

EAST GERMANY

INTERFACE UNIT FOR COUPLING THE MB 1250 MAGNETIC TAPE RECORDER AND THE DFE 550 DATA TRANSMITTER

East Berlin AUTOMATISIERUNGSPRAXIS in German Vol 13 No 8, Aug 76 [Supplement to MESSEN STEUERN REGELN Vol 19 No 8, Aug 76] pp 181-184

BERNSTEIN, K., Mittweida Engineering College and Computer Electronics State Enterprise, Meiningen

[Abstract] The design, construction, operation, and performance of an interface between the MB 1250 magnetic tape recorder and the DFE 550 data transmitter are described and illustrated with block and circuit diagrams. The general function components are the level adapter unit, the operating-speed adapter unit, the buffer memory, the shift register, two counters, instruction block, status evaluation block, error-block reporting unit, END processor, hold circuit, switchon killer, time comparator, beat generator, recording block, and Call-End logic unit. While the interface was designed for the two units named, it may also be used for other units. Figures 3; tables 1; references 1 German.

EAST GERMANY

THE DATA HANDLING PROCESS FOR PROTECTION PURPOSES

East Berlin ELEKTRIE in German Vol 30 No 7, 1976 pp 385-386

BINDER, Norbert, graduate engineer, scientific assistant and college engineer, and LENGYEL, Karl-Heinz, research student, Electrical Engineering Section, Dresden Technical University

[Abstract] At the rate of growth of electrical energy use, as the voltage levels show an increasing trend, the use of inductive test transducers becomes less and less desirable. It is desirable in the future to use a new means for test-value generation and transmission, and to simplify the processes of test-value acquisition and processing. It is advisable for the output signals of the novel and unconventional test-value transducers, which are difficult to convert into analog signal (from the usually pulse-like form), to be directly processed further. This will reduce the complexity of the system and the effort needed by the user. PDM and null-pass signals offer a possibility. They are briefly discussed. Figures 2; reference: 1 German.

EAST GERMANY

PROBLEMS IN THE REALIZATION OF DIRECTIONAL BROADCAST SYSTEMS IN THE FREQUENCY RANGE ABOVE 12 GHz

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 9, 1976 pp 350-351 manuscript received 18 Aug 75

MANSFELD, W., Chamber of Technology, Radeberg

[Abstract] In order to realize a new directional broadcast system, the following factors must be considered: The distribution of damping, the transmission method, and the power balance. At the present state of the art, the required RF power may be achieved a) with frequency multiplier after stabilized transistor oscillator, with or without frequency conversion in the RF range; b) constant-frequency generator with frequency conversion in the RF range; c) direct RF amplifier; and d) phase-controlled RF generator. Means for providing low-noise receiver frequency conversion, selection of RF conditions, and construction features are described. In the future it will become necessary to establish directional broadcast systems in frequencies above 12 GHz. For technical reasons, the above-15 GHz range appears to be suitable, and it is likely that digital transmission methods will predominate. The state of the art permits us to build such systems at the present time. No references.

USSR

DEVICE FOR BLOCKING OF ULTRA-SHORT WAVE COMPANDERS

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 p 67

[Abstract] The ultra-short wave compander-blocking device can be used in conjunction with standard measuring equipment for determining the electrical parameters of intercity audio-frequency broadcast channels without disconnecting companders. The equipment can be used to measure: nonuniformity of amplitude-frequency response up to +5 dB in the frequency band of 50-450, 2000-10000 Hz; integral interference level and psophometric noise level within limits from -65 to -45 dB; harmonic coefficient with respect to second and third harmonics of a frequency of 800 Hz within limits from 0.5 to 5%; crosstalk level on 2000 Hz at a compander blocking signal level of -40 dB on 800 Hz. The device includes a transmitter and receiver in a common housing. Technical data are given on the transmitter and receiver. Power supply is from a 220 VAC line with power consumption not exceeding 20 VA. Measurements are 490x475x175 mm and weight is 20 kg.

USSR

NEW TYPE PROJECT MATERIALS

Moscow AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 11, 1976 p 16

[Abstract] This is a brief list of new type project materials, approved and brought into use by the Main Administration of Signaling and Communications of the Ministry of Railroads.

USSR

UDC 621.314.5

CONVERTER FOR CONTACTLESS TRANSMISSION OF SLOWLY CHANGING SIGNALS FROM ROTATING OBJECTS

USSR AUTHOR'S CERTIFICATE No 455290, FILED 13/08/73, PUBLISHED 30/12/74 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10A129P]

GUSEV, V. G., GUSEV, G. A., and ANDRIANOVA, L. P. [Ufa Aviation Institute]

[Text] A converter is proposed for the contactless transmission of slowly changing signals from rotating objects, containing a magnetic circuit composed in the form of two hemispheres of ferromagnetic material, two coils immovably installed in the end parts of the magnetic circuit, and a movable coil situated between the two immovable coils.

With the object of increasing the accuracy and transmission factor of the converter, an auxiliary magnetic circuit, composed in the form of a closed core with coils, is installed between the outer walls of the ferromagnetic hemispheres, and interlayers of nonmagnetic material are installed between the auxiliary magnetic circuit and the ferromagnetic hemispheres. Figures 1.

USSR

UDC 621.317.7.087.92-932

A HIGH-FREQUENCY VOLTAGE-TO-FREQUENCY CONVERTER BASED ON AN AVALANCHE TRANSISTOR WITH PULSE DOSING OF THE CHARGE

IZVESTIYA VYSSHIKH UCHEBNIKH ZAVEDENIY. PRIBOROSTROYENIYE in Russian Vol 19, No 4, 1976 pp 85-89

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10A215 by V. K. Pryanikova]

D'YAKONOV, V. P.

[Text] There is described a new circuit of a quick-response converter in which the functions of the threshold device and the charge-dosing devices are unified and are performed by one avalanche transistor. The quick nanosecond response of the avalanche transistor in combination with the simple circuit permit the limit frequencies of the converter to be brought to tens of MHz.

For obtaining $f_{\max} \approx 30$ MHz, R_b should be decreased to approximately 100 ohms and lower-voltage avalanche transistors should be used with $U_M \approx 20$ to 25 volts. In such converters ordinary high-frequency transistors (e.g., the GT313A) can also be used, working under avalanche conditions. The temperature drift of frequency is $\leq 0.02 - 0.05\%$ at 1°C . Figures 2; references 3.

A METHOD OF ELECTRONIC FREQUENCY SHIFTING

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 61-63 manuscript received
15 Apr 74

ZIMIN, N. P., SKRIPNIK, YU. A. and YANENKO, A. F.

[Abstract] A method of electronic frequency displacement is proposed that is based on periodic control of the phase states of a harmonic frequency divider. Control conditions are analyzed and it is shown how the output frequency depends on the control pulse parameters. The main advantages of the proposed frequency shifting technique are the simplicity of electronic control, the stability of the resultant displacement, the absence of an image component of frequency shift, and also the linear dependence of displacement on the voltage of the controlling frequency. This method of shifting the frequency of the output waveform of a harmonic divider can be used in automatic frequency converting devices to shape the heterodyne voltage, in spectrum analyzers, instruments for measuring linear distortions, in phase measurement and phase-shaping equipment, and also for tuning the frequency of crystal-controlled oscillators and infralow-frequency band splitting.

Figures 8; references 3 Russian.

Electromagnetic Wave Propagation;
Ionosphere, Troposphere

USSR

UDC 533.925

CONCERNING THE PARTICULARS OF BACKSCATTERING OF ELECTROMAGNETIC WAVES BY A METAL SPHERE COVERED WITH A RADially INHOMOGENEOUS PLASMA ENVELOPE

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, pp 1556-1559
manuscript received 17 Sep 75

PERMYAKOV, V. A., Moscow Power Engineering Institute

[Abstract] The details of backscattering of electromagnetic waves by an ideally conductive sphere with a radially inhomogeneous plasma envelope are examined by rigorous numerical analysis and in the geometric optics approximation. It is shown that as the parameters of the plasma envelope vary the backscattering cross section has a minimum where the electron concentration on the surface of the sphere (with monotonically increasing $\epsilon(r)$) reaches the critical value. In this connection the minimization of the backscattering cross section affords a graphic and simple physical interpretation in the geometric optics approximation. The technique can be extended to nonspherical shapes with more general plasma inhomogeneity, using an analog of the method of physical optics of inhomogeneous media in quantitative analysis. Figures 3; references 4 Russian.

USSR

UDC 621.371

ON CHANNELING OF ELECTROMAGNETIC WAVES IN MEDIA WITH JET FLOW

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976 pp
1564-1566 manuscript received 12 May 75

PIKULIN, V. D. and STEPANOV, N. S., Gor'kiy State University

[Abstract] When electromagnetic waves propagate in the vicinity of jet currents, waveguide channels may be formed, and under certain conditions the waves in such a channel may be unstable. In this paper the authors briefly examine the case of a smooth plane laminar jet flow in a dielectric medium. It is shown that the channeled waves in this case are stable. References 5: 4 Russian, 1 Western.

HUNGARY

UDC 621.317.382.029.6

A HIGH-PRECISION METHOD OF MEASUREMENT OF POWER IN THE MICROWAVE FREQUENCY RANGE

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 11, Nov 76 pp 340-345 manuscript received 24 Jan 76

TOROK, Andras, graduate electrical engineer, National Metrology Bureau

[Abstract] The development of a bolometric method for highly accurate power measurement in the microwave frequency range was described. D.c. power measurement is the basis of the method (through determination of voltage and resistance). Bolometric transducers are used by means of the substitution technique. The accuracy of the test standards is ensured by means of calorimetric calibration (using a high-accuracy microcalorimeter). The set of standards, the calibrating microcalorimeter (its operating principle, design, construction, sensitivity, and accuracy), the operating procedure, and the achieved accuracy and precision are discussed and illustrated. The next task is to establish a set of coaxial power standards encompassing the entire microwave range now in use (1 to 18 GHz). Figures 6; tables 3; references 7: all Western.

EAST GERMANY

MODERN MEANS FOR CARRYING OUT EXPERIMENTAL STUDIES ON SWITCHING ARCS

East Berlin ELEKTRIE in German Vol 30 No 6, 1976 pp 301-304

KEITEL, J., dr of engineering, department head, and BEER, F., dr of engineering, staff scientist, Institute of Control Engineering, Electrical Devices Works Combine State Enterprise, Berlin-Treptow

[Abstract] In this article, which is an abbreviated version of the authors' lecture delivered at the 2d Scientific and Technological Conference of the K EAW [Electrical Devices Works Combine State Enterprise] held in 1976, two devices are described. 1) The device for measuring the rate of light-arc movement employs photodiodes which convert the light signals emitted by the arc into electrical signals; it is made up of light-conducting cable, photodiode, Schmitt trigger, astable multivibrator, AND circuit, monostable multivibrator, amplifier, and measuring device. 2) The device for measuring light-arc energy permits the direct reading of the energy value on a display or the oscillographic recording of the temporal course of energy and power; it performs electronic integration of the voltage and current signals, and integrates them over time. Figures 7; no references.

Quantum Electronics, Lasers,
Masers, Holography, Quasi-Optical

EAST GERMANY

SYSTEMS FOR AUTOMATIC IMAGE SCANNING, USING IMAGE SCANNING TUBES OR MEASURING
LOOPS

East Berlin AUTOMATISIERUNGSPRAXIS in German Vol 13 No 8, Aug 76 [Supplement
to MESSEN STEUERN REGELN Vol 19 No 8, Aug 76] pp 189-192

KIRST, H.

[Abstract] This article describes a test setup for image scanning with electron-beam tubes and one for image scanning with measuring loops. The former system is very useful if the entire picture screen surface is utilized; this provides excellent resolution and high stability. The electron-beam tubes are very flexible since they permit changing the scan direction, and the distance and the location of the scan in a practically inertia-free manner. Devices such as vidicons or plumbicons have a memory effect, lower resolving power, and not compensable sensitivity fluctuations. Systems with measuring loops (such as deflectable mirrors) are suitable for devices with complete or partial human control. They have adequate resolving power and speed for most applications. They may be developed to perform automatic tracking. Some versions utilize a rotating slit. The latest developments employ charge-transfer devices. They have a resolving power in the same range as the vidicons but they are much better in coordinate accuracy. Laser-based devices have excellent future potential. Figures 4; references 13: 6 German, 1 Russian, and 6 Western.

Microelectronics and General Circuit
Theory and Information

USSR

MICROCIRCUITS IN THE AUTOMATIC RECORDING LEVEL CONTROL SYSTEMS OF TAPE
RECORDERS AND PORTABLE DICTAPHONES

Moscow RADIO in Russian No 10, Oct 76 pp 43-44

PASHININ, S., engineer, Moscow, ORLOV, P., engineer, and PRASLOV, M.,
engineer, Lyubertsy, Moskovskaya Oblast

[Abstract] The article gives schematics and operating principles of conventional automatic VU control circuits for a tape recorder and a portable dictaphone. Each circuit utilizes two IC difference amplifiers, and the level control circuit for the tape recorder also includes a third IC limiter amplifier. Figures 2.

USSR

UDC 621.396.622.3

PRESET-CONTROL BFOs FOR RADIOSPECTROMETERS

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976
pp 1554-1556 manuscript received 9 Sep 75

YEGOROVA, T. M., MOGILEVA, V. G. and RYZHKOV, N. F., Leningrad Affiliate of
the Special Astrophysics Observatory, Academy of Sciences USSR

[Abstract] BFOs with preset frequency control on wavelengths of 21, 18, 6.2 and 1.35 cm have been developed for the radiospectrometers of the RATAN-600 radio telescope. All the oscillators are based on klystrons with phase AFC on a harmonic of a high-stability tunable reference signal. The block diagram of the 21-cm BFO is given and the principle of operation is explained. The other oscillators are similar, the only difference being the number of the harmonics of the reference signals that are used. Frequency tracking is accurate within 400 Hz on a heterodyne frequency of about 1375 MHz, i.e., the maximum relative error is no greater than $3 \cdot 10^{-7}$. Figures 1; references 3 Russian.

USSR

UDC 621.396.628:523.164

INFLUENCE OF RELATIVITY EFFECTS ON CLOCK SYNCHRONIZATION BY AN ULTRALONG-BASE RADIO INTERFEROMETER

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976 pp 1455-1458 manuscript received 17 Sep 75

MAKSIMOV, V. I. and TROITSKIY, V. S., Radiophysics Scientific Research Institute

[Russian abstract provided by the source]

[Text] An investigation is made of the influence that the "Sanyako effect" has on use of an ultralong-base interferometer for synchronizing clocks that are separated by a considerable distance. Formulas are presented that take account of the "Sanyako correction" resulting from rotation of the clocks to be synchronized relative to the selected inertial coordinate system. A brief comparative analysis is made of the magnitude of this correction (reaching 200 ns) for different methods of synchronizing clocks located on the earth. References 3: 1 Russian, 2 Western.

CONCERNING THE CORRELATION PROPERTIES OF A SIGNAL REFLECTED FROM A TARGET

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 9-15 manuscript received 15 Jan 76

AL'BATS, M. YE., and VNOTCHENKO, S. L.

[Abstract] The paper considers the correlation function of a signal reflected from a target, at the input of a receiver, for the most common case of mutual movement of a radar and target. The target is represented by a model in the form of a finite number of "bright points" localized in the limits of the space occupied by the target. Such a model is approximate and does not take into account the fluctuations produced by a change of the polarization of a wave incident to the target, and some secondary peculiarities, as, for example, mutual shading of the dishes. Very frequently in the literature, back scattering diagrams (BD) are used for the characteristic of the reflecting properties of the target. In the present paper it is shown that the proposed model makes it possible to describe fluctuations of reflected signals, avoiding BSD. Figures 5; references 7 Russian.

Receivers and Transmitters

USSR

AN AUTOMATIC THREE-BAND TRANSMITTER

Moscow RADIO in Russian No 10, Oct 76 pp 22-23

VERKHOTUROV, V., master athlete of the USSR, international class, and
KALACHEV, V., master athlete of the USSR, Moscow

[Abstract] This is the conclusion of an article started the preceding month (see "Radio," No 9, Sep 76 p 17). Details are given on the construction and alignment of the transmitter. Specifications are given on the wire, type of winding, number of turns and cores for the chokes and induction coils. Figures 3; tables 1.

HUNGARY

UDC: 621.314.63.07:621.382.233:621.397.331.221

TEST PATTERN FOR THE DEVELOPMENT AND MANUFACTURE OF MOS CIRCUITS WITH SILICON GATE

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 11, Nov 76 pp 346-349 manuscript received 15 Dec 75

KOVACS, Ferenc, Dr, Research Institute of the Communications Technological Industry

[Abstract] This article discusses the designing aspects of test patterns, the uses of the test patterns, the checking of operational parameters for the purpose of process control, the determination of the factors affecting yield, accelerated stress testing, and the individual components of the test patterns (diffusion resistor strip, polysilicon resistor strip, contact chain, aluminum strip, combs of aluminum, polysilicon, and diffusion, component controlling the contact-window fitting, polysilicon gate adapter, thin-oxide capacitor, thin-oxide comb capacitor, thin-oxide comb capacitor open on the side, thin-oxide capacitor above the diffusion range, gate-controlled diode, contact diode, measuring transistors, large-surface measuring transistor, thick-oxide transistor, dual gate outlet, heatable measuring transistor, measuring transistor with inhomogeneous dielectric, floating control-electrode measuring transistor, lateral bipolar transistor, surface ions, gated measuring transistor, inverter stages, and ring oscillator) and their functions. Figures 4; references 11: 1 Yugoslav and 10 Western.

USSR

UDC 621.315.592

ELECTROLUMINESCENCE OF HETEROJUNCTIONS BASED ON $\text{Al}_y\text{Ga}_{1-y}\text{As}_{1-x}\text{Sb}_x$

Leningrad FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 10, No 5, May 76
pp 847-850 manuscript received 18 Aug 75

DOLGINOV, L. M., DRUZHININA, L. V., IBRAKHIMOV, N., and ROGULIN, V. YU.,
State Scientific-Research and Planning Institute of the Rare Metal Industry,
Moscow

[Abstract] The outlook is shown for the creation of electroluminescent diodes based on the epitaxial structures of solid solutions of GaAs--GaSb obtained by the method of liquid-phase epitaxy. Preliminary investigations of the electroluminescence of structures based on this material were described in an earlier work of which L. V. Druzhinina was the principal author [FTP, 8, 2026 (1974)]. Experimental data are presented on the zone diagram of the heterojunction $\text{p-GaAs}_{1-x}\text{Sb}_x\text{-n-Al}_y\text{Ga}_{1-y}\text{As}_{1-x}\text{Sb}_x$. Figures 2; references 3: 2 Russian, 1 Western.

USSR

UDC 621.315.592

ENERGY SPECTRUM AND THERMAL STABILITY OF RADIATION-INDUCED DEFECTS IN
p-TYPE Si

Leningrad FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 10, No 5, May 76
pp 966-969 manuscript received 15 Apr 75

PETROV, V. V. and TKACHEV, V. D., Belorussian State University imeni
V. I. Lenin, Minsk

[Abstract] This short communication is concerned with a determination of the position of the energy levels of radiation centers and an investigation of their thermal stability in p-type silicon by the method of measuring the spectra of extrinsic photoconductivity. In the experiments specimens of silicon with an initial resistivity $\rho_{in} = 1 \div 5 \text{ ohm.cm}$ were used, cut out of single crystals grown in quartz crucibles with an oxygen concentration $> 5 \cdot 10^{17} \text{ cm}^{-3}$, and obtained by the method of crucibleless zone melting in a vacuum with an oxygen concentration $< 5 \cdot 10^{16} \text{ cm}^{-3}$. The specimens were irradiated in a reactor by an integrated flux of fast neutrons (10^{15} and 10^{16} particles/cm²) at a temperature not higher than 70°C. The authors thank N. I. Akulovich for participation in conducting the experiment. Tables 1; references 11: 3 Russian, 8 Western.

HUNGARY

UDC 621.373.51.029.6:621.382.2.029.6

MICROWAVE DIODE OSCILLATORS

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 11, Nov 76 pp 321-332 manuscript received 25 Mar 76

BERCELI, Tibor, dr, Research Institute for Telecommunications

[Abstract] Using unified and simple models, which also permit the unified characterization of the oscillators, this article first presents examples for the practical realization of the oscillators with microwave diodes. Then, on the basis of equivalent circuits, it determines the oscillation frequency and the output. It discusses in some detail the establishment of the oscillation and the working-point stability. It derives basic expressions for frequency modulation with varactor diode. It examines the amplitude and frequency noise and the signal-to-noise ratio. Finally, it discusses losses and environmental effects. The equivalent circuit used combines the oscillator with a voltage-controlled active component. However, for certain purposes current-control is preferable, for example in special oscillator types. The modifications needed in the model to convert from voltage- to current-control are described. Figures 32; references 15: 1 German, 1 Hungarian, 1 Polish, 1 Russian, and 11 Western.

USSR

UDC 621.373.42.621.316.726

OSCILLATORS STABILIZED BY THREE TANK CIRCUITS INCLUDING A SUPERCONDUCTIVE RESONATOR

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10, Oct 76 pp 16-23 manuscript received 24 Jun 75

MINAKOVA, I. I., MININA, G. P., PANOV, V. I., and PETNIKOV, V. G.

[Abstract] Narrow-band microwave oscillators for radiophysical measurements and radio engineering applications can be frequency stabilized with quantum-device precision and, as the theoretical analysis here shows, the most effective method of achieving this is with a system of three tank circuits in series: the oscillator tank followed by an intermediate stage and the stabilizer stage at the end. The practicality of this method has been confirmed by experiments with a GaAs tunnel-diode oscillator (nominal frequency 1.2 GHz) and superconducting niobium (nominal temperature 2°K) in the stabilizer stage, the latter capable of holding the relative frequency deviation to about 10^{-15} at temperature fluctuations of about 10^{-5} °K. Figures 5; references 10: 6 Russian, 4 Western.

USSR

UDC 621.382.029.64:621.376

MINIMIZATION OF INTRAPULSE PHASE DISTORTIONS IN MICROWAVE POWER MODULATORS

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10, Oct 76 pp 38-42 manuscript received 22 May 74; after revision, 24 Feb 75

KORNEYEV, V. A. and KAGALENKO, B. V.

[Abstract] Narrow radio pulses with a low level of distorting intrapulse phase modulation are required in long-range radar. This is feasible by designing the microwave power modulators as n-cascade rather than double-tuned networks with the active p-n junction devices spaced at unequal distances, which also yields a higher percentage modulation. The results of a general analysis by the topology method are applied to practical configurations such as a two-stage and a three-stage ($n > 2$) network. The requirements for optimum compensation, i.e., minimum distortion are established, assuming a negligible transient time and a noncomplex frequency. The advantages and the necessary tradeoffs in terms of transfer ratio, interstage coupling, signal decoupling, as well as phase and amplitude modulation characteristics are then compared. Figures 4; references 4 Russian.

USSR

UDC 535.2

SYNCHROTRON RADIATION OF A SOURCE MOVING AT SUPERLIGHT VELOCITY

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976 pp 1523-1530 manuscript received 21 May 73; after completion, 29 Mar 76

AFANAS'YEV, S. V., Kalinin State University

[Abstract] The author considers the following model of a source of synchrotron radiation. A narrow beam of charged particles is scanned by a deflector so that it outlines a circle of given radius on a screen. If Ψ is the angle of inclination of the particle front to the surface of the screen at the contact point, the velocity of the light spot is $v_* = v \cot \Psi$, where v is the velocity of the particle. The velocity of this imaginary source can take on any value, including superlight velocities, by reducing the angle Ψ . It is shown that when $v_* > c$, the maximum intensity of synchrotron emission is

observed on frequencies of the order of $\omega_{cr} = \frac{3c}{2\alpha} \frac{\beta_*}{[2(\beta_* - 1)]^{3/2}}$ ($\beta_* = v_*/c$,

α is the radius of the circle traced on the screen). Figures 1; references 11 Russian.

USSR

UDC 535:621.378

QUASI-OPTICAL RADIO IMAGE FORMATION IN THE PASSIVE MODE

Gor'kiy IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976 pp 1513-1517 manuscript received 16 Jul 75

GEL'FER, E. I., LEBSKIY, YU. V., FINKEL'SHTEYN, S. YE. and YAKUN', N. A., Gor'kiy State University

[Abstract] Studies are done on radio image formation in passive observation of remote objects on millimeter waves as a function of the temperature contrast of the object and the background, the sensitivity of the reception equipment and conditions of observation. Experiments on direct quasi-optical radio image formation were done in the passive mode in the 3 mm wave band at a distance of 5 m between object and receiver. A parabolic dish and elliptical counter reflector were used to form the image, which was picked up by a horn. Scanning was by mechanical displacement of the counter reflector. The thermal radio emission picked up by the horn was transmitted by microwave channel to a 3-mm radiometer. The lowest temperature difference for radio image formation was found to be 20-25 K. The minimum theoretical contrast was found to be around 7 K. Figures 6; references 11; 10 Russian, 1 Western.

MECHANISM OF CONTROLLED BREAKDOWN IN A DISCHARGER WITH SPARK IGNITION

Moscow ELEKTRICHESTVO in Russian No 11, Nov 76 pp 18-23

ZHUKOV, N. V., Moscow Power Engineering Institute

[Abstract] Experimental evidence based on tests with an electro-optical converter and a photomultiplier, followed by measurements of the photoionization rate in the atmosphere, refutes some earlier hypotheses concerning the breakdown initiation process in a controlled spark discharger. The process is analyzed here theoretically in the case of a trielectrode discharger with a given distance between and a given voltage applied to the two main electrodes. The problem of breakdown initiation by external ionizing radiation reduces to the problem of a transient nonself-sustaining current and a field redistribution in the plasma. An exact solution can be obtained on the basis of a few simplifying and practical assumptions. In the extreme cases of a very long or a very short interelectrode distance ($0.5 > d > 2.5$ cm) it is necessary, furthermore, to refine the absorption measurements. The general conclusions are that breakdown in a trigatron with spark ignition is initiated primarily through photoionization of air by ultraviolet radiation from the spark. The model of this mechanism constructed here is useful for determining the space-time distribution of the electric field intensity in the main gap and the threshold breakdown voltage when the spark-radiation parameters are known. Figures 6; references 8: 7 Russian, 1 Western.

Components and Circuit Elements
Including Waveguides and Cavity Resonators

HUNGARY

UDC 006.77:621.316.541.023:621.372.831

SOME METROLOGICAL RAMIFICATIONS OF THE STANDARDIZATION OF HIGH-FREQUENCY
COAXIAL CONNECTORS

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 11, Nov 76 pp 337-339 manu-
script received 24 Jan 76

VOLGYESI, Sandor, Dr, National Metrology Bureau

[Abstract] There are two approaches to meet the new demands placed on high-frequency coaxial connectors as a result of their increasing usage and advancements in the using industries: improvement of existing types (for example improvements made in the so-called Type N connectors) and development of new types (for example development of Types GR 900, PC-7, Precifix A, and Precific SM). This article reviews the existing connector types, with special emphasis on the precision types, and discusses various aspects of their standardization. A joint standardization effort is underway among the CEMA countries; the Hungarian participant in this effort is the National Metrology Bureau for methods of measurement and administration, and the Telecommunications Research Institute for development work. The project now considers a 7/3mm nominal diameter precision, non-polarized connector. The performance parameters of this connector are described and discussed. Figures 7; table 1; references 4: 2 Western. 1 Hungarian, and 1 Russian.

USSR

UDC 621.3.029.65

A WAVEGUIDE FILTER FOR A WIDE-BAND COMMUNICATION LINE IN THE MILLIMETER WAVE BAND

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 30-35 manuscript received 16 Feb 76

VOL'MAN, V. I., MEL'NIK, P. G., MURAVTSOV, A. D. and SARKIS'YANTS, A. G.

[Abstract] A waveguide filter is proposed for the millimeter wave band with a three-decibel directional coupler, a tapered adapter, a band-elimination filter section, a phase shifter and an adapter to a waveguide of standard cross section. The directional coupler has four branches, two at the input and two at the output. Signals on frequencies f_1 , f_2 and f_3 enter the first input branch, where the energy is split and sent to the output branches, the phase difference being 90° . The band-elimination filters pass f_1 and reflect f_2 and f_3 , which are summed in the other input branch, where the resultant signal is coupled out. At the output of the band-elimination filter section, the signal on f_1 appears as two H_{10} waves of the same amplitude with phases displaced by 90° . The phase shifter balances the phases and the adapter joins the system to a standard waveguide. Theoretical and experimental data are given on the directional coupler, band-elimination filter section and phase shifter. The proposed filter introduces split-band losses of the order of 1.2-1.5 dB with attenuation on the adjacent split-band of 30 dB or more when the frequency spread between split-bands is 500 MHz. Figures 7; references 6; 4 Russian, 2 Western.

USSR

UDC 621.317.34

DETERMINATION OF THE POWER LEVEL OF HIGHER WAVE MODES

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 44-46 manuscript received 30 Jan 75

NADENENKO, B. S. and POLUSHIN, G. P.

[Russian abstract provided by the source]

[Text] Computational formulas are presented for determining the level of excitation of higher wave modes in multimode waveguides from the characteristics of reflectivity and nonuniformity of group delay time of a shorted multimode waveguide. Practical examples of application of the proposed technique are examined. Figures 7; references 7; 6 Russian, 1 Western.

REFLECTION OF ELECTROMAGNETIC WAVE FROM GYROMAGNETIC STEP IN A RECTANGULAR WAVEGUIDE

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 30-34 manuscript received 18 Jul 75; after completion, 2 Apr 76

KAPILEVICH, B. YU., FEDOTOVA, T. N., and SIMIN, N. S.

[Abstract] Transmission lines with gyromagnetic media (magnetized ferrites) are widely utilized for creation of various devices of the microwave band. The boundary dielectric--magnetized ferrite which appears during this leads to a partial reflection of the electromagnetic wave. The latter can exert a significant affect on the parameters of the device. In the present paper a calculation is made of the reflections from a semi-infinite transverse magnetized ferrite plate in a rectangular waveguide. Such a structure makes it possible to evaluate the reflections of a number of devices, the ferrite filling in of which is close to the configuration shown in the paper. As an example, the results are presented of a calculation of the reflections in a structure which is a model of a reciprocal ferrite phase shifter. An experimental check of the results of the calculation was conducted in the 3-cm band. A waveguide with a width of 2.3-cm was filled with two ferrite plates, each 0.21-cm wide, were magnetized by an external field in a direction perpendicular to the waveguide walls. The results of the experiment satisfactorily agree with the calculation. Figures 2; tables 1; references 8: 4 Russian, 4 Western.

A VARIANT OF REALIZATION OF A FREQUENCY MULTIPLIER

Moscow ELEKTROSVYAZ' in Russian No 10, Oct 76 pp 64-66 manuscript received 4 Jun 75

MUZHICHKOV, M. B.

[Russian abstract provided by the source]

[Text] The author examines a variant of a bridge-type aperiodic frequency multiplier based on a nonlinear element that has a stepped current-voltage characteristic. Considerations are presented on synthesizing a stepped current-voltage characteristic from parallel branches consisting of series connection of stabilitrons and transistors with fixed biasing in the base circuit. Figures 5; references 7 Russian.

USSR

UDC 621.391.13

OPTIMUM RECEPTION DURING FLUCTUATION AND CONCENTRATED NOISE WITH ADAPTIVE MULTIPOLAR FILTERS

Moscow RADIOTEKHNIKA in Russian Vol 31, No 10, Oct 76 pp 52-61 manuscript received 19 May 75

SIKAREV, A. A., and TSYGANKOV, V. V.

[Abstract] The paper is concerned: 1) With the establishment of the time and frequency characteristics of adaptive matched filters resulting from optimum principles of reception; 2) With consideration of a solution to the problem of synthesis of such filters on a Fourier trigonometric basis; and 3) With an evaluation of the efficiency of operation of a communication system which uses such filters. Principal attention is paid to separate coherent and noncoherent reception. Figures 4; references 8 Russian.

USSR

UDC 656.25:621.382.2/.3

KONTAKTRONS IN AUTOMATION AND TELEMECHANICS EQUIPMENT

Moscow AVTOMATIKA-TELEMEKHANIKA-SVYAZ' in Russian No 11, 1976 pp 15-16

ZEKTSER, D. M., deputy chief engineer of "Transsvyaz'" Plant, candidate of technical sciences

[Abstract] The paper discusses the application of a kontaktron, i.e., an armatureless or reed relay, which consists of a hermetically sealed magneto-controlled contact (gerkon) and excitation coils. In comparison with an electromagnetic relay, the kontaktrons have a number of advantages. They have a greater reliability of contact, resulting from the hermetic sealing, which protects against dust, moisture and gas which give rise to corrosion; the short response time because of the small mass of the contact springs; the more stable operation under vibration conditions and the absence of a necessity for supplementary regulation of the contacts. These advantages make it possible to employ kontaktrons in automation and telemechanics equipment and in amplifiers for automatic locomotive signaling. Figures 1; tables 2.

USSR

LEAD-ACID CELLS

Moscow RADIO in Russian No 10, Oct 76 p 17

[Abstract] A brief discussion of the principles of operation, design features and advantages of lead-acid cells and storage batteries as portable power supplies. Starter battery designations are explained. The first figure preceding the letters gives the number of cells connected in series; the letters ST designate that the unit is a starter battery; the numbers following the letters give the rated capacity [presumably in ampere-hours] for a 20 hour discharge cycle. Letters following the battery type designation give the casing material (E -- ebonite, T -- thermoplastic or polyethylene, P -- asphalt-laminated plastic) and the separator material (R -- mitor, M -- miplast, S -- fiberglass), for example 6ST-60EM. The letter K is used for batteries for motor launches, and T designates tractor battery. Batteries for motorcycles are designated by MT, and for motor scooters -- by MTR (3MTR-10, 3 MT-6). Plate and filament batteries for radio equipment are designated 10-RA11 (plate battery) and 3RN-75, 3RN-115 M (the M indicates an updated version). Figures 1.

1/1

EAST GERMANY

RELIABILITY AND FOREIGN-LAYER FORMATION ON SWITCHING CONTACTS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 9, 1976 pp
347-350 manuscript received 24 Dec 75

HOEFT, H., Chamber of Technology, Karl-Marx-Stadt Technical University

[Abstract] This article discusses possible compounds of oxygen and silver in the gas discharge in the course of switchoff, the equilibrium conditions of chemical reactions, identification of ozone, relationships between circuit and gas discharge, and some results of ozone measurements. From the results of the ozone measurements it appears likely that oxidation of the noble metals in general, and of silver in particular, does take place. The pressure and temperature conditions prevailing in the gas discharge are favorable for such oxidation. But there are also areas where reduction takes place. One must therefore assume that the metal vapor oxidizes at the edge of the gas discharge zone in a tubular area, and that the electrodes oxidize at the foot point of the gas discharge. There is some correlation between the failure probability and the amount of ozone generated in each switching process, meaning that the switchoff current affects reliability. Figures 7; references 6: all German.

Certain Aspects of Computer
Hard and Soft Ware

USSR

UDC 517.948.5:517.512.2

THE FAST FOURIER TRANSFORM IN COMPUTATIONAL PHYSICS. (A SURVEY)

Gor'kiy, IZVESTIYA VUZov, RADIOFIZIKA in Russian Vol 19, No 10, 1976
pp 1425-1454 manuscript received 23 Jul 75; after completion, 3 May 76

ROSHAL', A. S., Moscow Engineering Physics Institute

[Abstract] A survey of the literature on computer techniques, software and hardware for use of the fast Fourier transform in applied physics problems. The peculiarities of certain other types of fast transforms are also examined. The bibliography is conveniently divided into sections corresponding to the main divisions of the survey: General works; Theory of finite Fourier transformation; methods and algorithms of fast Fourier transformation; Use of the fast Fourier transform; Specialized computing devices; Other types of fast transforms. References 185: 36 Russian, 149 Western.

USSR

UDC 681.327.12

DEVICE FOR CONVERTING THE COORDINATES OF OBJECTS

USSR AUTHOR'S CERTIFICATE No 492895, FILED 6/12/73, PUBLISHED 4/02/76 in
Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA
TEKHNIKA No 10, 1976 Abstract No 10A135P]

ANDREYEV, V. N., BRUYAKIN, V. P., NOVIKOV, A. V., and SUL'ZHENKO, YU. F.

[Text] A device is proposed for converting the coordinates of objects, which contains an illuminator optically connected to a scanistor which, in its turn, is connected to the displacement source and to the scanning-voltage source which, in its own turn, is connected to one of the inputs of the mismatch-signal shaper. The other input of the mismatch-signal shaper is connected to the output of the amplifier-shaper, and the output is connected via the power amplifier to a motor mechanically linked to the angle-code converter.

With the object of increasing the conversion accuracy, the device contains a feedback sensor, completed in the form of a potentiometer connected parallel to the displacement source. The movable contact of the potentiometer is connected to the input of the amplifier-shaper, and the potentiometer axis is mechanically linked to the motor. Figures 1.

USSR

UDC 621.377.622.322.2

DEVICE FOR BROACHING OF DIGITAL STORE MATRICES

USSR AUTHOR'S CERTIFICATE No 433538, FILED 25/02/72, PUBLISHED 25/06/74
in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA
TEKHNIKA No 10, 1976 Abstract No 10B377P]

TSAPLIN, D. V.

[Text] The invention may be used for broaching coordinate wires of store matrices on ferrite torroidal-shaped cores 0.3 mm and more in diameter. These devices require the obligatory application of broaching needles in which the wires are fastened, and the direct participation of an operator in the process of broaching the coordinate wire. It is namely these causes that bring about breakage of individual cores during broaching.

The object of the invention is to increase the reliability of matrix broaching. For this purpose there is introduced into the device a vibratory trough, mounted on the principal frame along the core axis behind the movable carriage, which effects orientation and broaching of the coordinate wire with a dosed force.

Since the production of masks for the orientation of cores with a diameter of less than 0.6 mm has not yet been mastered, and the improvement of store parameters is possible only with the use of cores of smaller size, in the device there is used a mechanism of successive orientation of the Y coordinate of cores strung on wires, which forms rows for the broaching of a second coordinate wire. The vibratory trough is used only during broaching of the second coordinate wire.

USSR

UDC 621.377.622.322.5

STORAGE MATRICES

USSR AUTHOR'S CERTIFICATE No 480113, FILED 8/12/73, PUBLISHED 13/11/75 in
Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA
TEKHNIKA No 10, 1976 Abstract No 10B392P]

SAVIN, A. N. and SHAKHNOV, V. A.

[Text] Storage matrices are known, which contain wire backings with a magnetic coating, situated between current-conducting buses. However,

the comparatively small area of envelopment of the information carrier by flat reading-bus conductors brings about scattering of the magnetic field along the film, which leads to a decrease of the information allocation density.

The object of the invention is to increase the information allocation density. The designated aim is attained by the fact that the current-conducting buses are made from a flexible thin metal foil, and are fastened on a rigid base with an elastic gasket. The wire backings with a magnetic coating are placed between groups of upper and lower current-conducting buses which, as a consequence of deformation of the elastic gasket, envelop the wire backings.

USSR

UDC 681.3-181.48

PROGRAMMABLE LOGIC MATRICES IN ELECTRONIC COMPUTERS

UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 1, 1976 pp 46-49

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B223 Resume]

OVSEPYAN, G. YE., OGANYAN, G. A., GONCHOYAN, V. G., SHCHETININ, YU. I., MITINA, V. A., and GRACHYAN, G. G.

[Text] The use is described of programmable logic matrices (PLM) as a method of microminiaturizing electronic-computer combination structures. Descriptions are presented of the functional state of PLM, and of a method of entering information in large integral PLM circuits; also presented are the principal electronic and design parameters of the matrix. Consideration is given to some fields of application of such matrices. Figures 2; references 5.

THE UTILIZATION OF ELECTRONIC COMPUTERS WHEN FILLING IN CHARTS FOR THE ELECTRICAL AND THERMAL REGIMES OF RADIO COMPONENTS

NADEZHNOT' I KONTROL' KACHESTVA in Russian No 2, 1976 pp 35-37

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B238 by O. V. Bachin]

ZENKEVICHYUTE, YA. V., CHEYCHIS, S. I., and TORGOVITSKIY, M. A.

[Text] A general algorithm has been developed for filling in regime charts by means of an electronic computer; in addition, algorithms have been compiled for each regime-chart form, which take into account the specific nature of filling in the regime charts of radio components of a given type. The initial data are fed to the computer from tables which are filled in by the person who measures the radio-component regime parameters. After input of the initial data, a selection of data of the technical conditions for the first component is taken from the storage unit.

The data are compared with those that have been fed to the computer, after which the necessary calculations are conducted, and the measured and calculated values are compared with the permissible ones in accordance with the technical conditions and the branch standards. Figures 1.

DIGITAL CORRELATOR FOR PULSE SIGNALS

USSR AUTHOR'S CERTIFICATE No 476567, FILED 28/03/73, PUBLISHED 28/11/75 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B180P]

BONDAREV, A. P., MOGIL'NER, A. I., and TIMOKHIN, L. A.

[Text] The proposed device contains a digital time-interval meter, an accumulating summator, and an accumulation unit. When the object of increasing the response speed of the correlator it contains a leveling memory unit, and a control unit connected by the inputs to the accumulating summator and the accumulation unit and by the outputs, respectively, to the accumulation unit and to the controlling inputs of the leveling memory unit. The input of the latter is connected with the digital time-interval meter, and the output is connected to the accumulating summator. Figures 1.

USSR

UDC 681.325.3

PRINCIPLES OF THE CONSTRUCTION OF DIGITAL-ANALOG CONVERTERS FOR ELECTRON-LITHOGRAPHIC INSTALLATIONS AND METHODS OF THEIR TECHNICAL REALIZATION

Kiev METODY MINIATYURIZATSII I AVTOMATIZATSII PROIZVODSTVA KOMPONENTOV EVM
[Methods of Miniaturizing and Automating the Production of Computer Components, Collection of Works] in Russian 1975 pp 30-43

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10A114 by N. I. Salkova]

DERKACH, V. P., MAKAROV, G. T., VLASENKO, V. M., and KUDELKO, O. M.

[Text] Consideration is given to questions of the construction of digital-analog converters for electron-lithographic installations with account taken of the features of the controlling computer and of the electron-lithographic installations. An investigation is made of some features of control of the magnetic feedback field which diverts the electron beam into the electron-lithographic installation. It is shown that with a change of the exciting voltage, the voltage at the feedback is proportional to the change of the diverting magnetic field.

Consideration is given to the possibilities of existing methods of converting a code into a proportional current. Some structural diagrams of digital-analog converters for electron-lithographic installations are presented, which possess high accuracy and quick response when the conversion scale is changed over a wide range. These diagrams provide for current in the feedback only in one direction. There is described a structural diagram of the converter, which has an electronic reverse based on a bridge circuit. Consideration is given to individual units of the converter. Figures 10; references 8.

USSR

UDC 681.325.3(088.8)(47)

ANGLE-CODE CONVERTER

USSR AUTHOR'S CERTIFICATE No 486343, FILED 12/12/73, PUBLISHED 5/01/76 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10A142E]

KONYUKHOV, N. YE., GRECHISHNIKOV, V. M., and PLYUT, A. A., Kuybyshev Polytechnical Institute

[Text] A known angle-code converter, containing a filament-optical coding device optically tied to the illuminator, has a limited range of conversion and insufficient operating exactness.

Increasing the operating exactness of the device is attained by the fact that between the illuminator and the filament-optical coding device a reflector is situated, made in the form of a multiturn specular helical line situated on a cylinder rigidly connected to the input shaft. Between the illuminator and the reflector a slit diagram is situated, rigidly connected to a slide block linked to the input shaft by a threaded connection and situated between parallel guides. Figures 1.

USSR

UDC 681.325.5(088.8)(47)

MICROPROGRAM PROCESSOR

USSR AUTHOR'S CERTIFICATE No 487390, FILED 8/06/73, PUBLISHED 20/01/76 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B357P]

ASTSATUROV, R. M., KOVALEV, O. S., KONDRAT'YEV, A. P., and MAL'TSEV, N. A.

[Text] The proposed device contains a microprogram control device, an arithmetic unit, a unit of registers, an internal storage, a data register, an erasure-signal decoder, recording-and-reading microoperations decoders for control of the arithmetic unit and the unit of registers, and a unit for starting the recording and reading microoperations. The outputs of the microprogram control device are connected with the inputs of the decoders and the unit of registers, respectively.

The outputs of the unit of registers are connected, respectively, with the first input of the unit for starting the reading microoperation with the input of the unit for starting the recording microoperation, with the second input of the unit for starting the reading microoperation, with the first inputs of the arithmetic unit and the unit of registers. With the object of simplifying the operation, the processor contains a unit for shaping the control signal of the data register, the input of which is connected with the output of the reading-microoperation decoder, and the output -- to the third input of the data register. Figures 1.

SENSOR FOR READING CYLINDRICAL MAGNETIC DOMAINS

USSR AUTHOR'S CERTIFICATE No 485500, FILED 4/10/72, PUBLISHED 27/11/75 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B423P]

RAYEV, V. K., KRASOVSKIY, V. YE., Institute of Electronic Controlling Machines

[Text] A device is known for reading cylindrical magnetic domains (CMD), which contains, as a reading sensor, a thin-film permalloy magnetoresistor, consisting of several series-connected magnetoresistive elements, situated in the plane of the surface of the magnetic carrier. Such sensors have obtained the most extensive distribution for reading CMD. They are distinguished by a simple technology, low power consumption, and a virtually unlimited service life.

However, the possible number of magnetoresistive elements in such sensors is very limited and the level of the output signal is correspondingly small.

This is explained by the fact that magnetoresistive elements may be situated only in a region where the radial components of the cylindrical magnetic domain perceptibly changes the state of magnetization of the permalloy film, i.e., no further than at a distance equal to the radius of the domain from the boundaries of the domain. The width of an individual magnetoresistive element is selected in practice to equal approximately $0.5 r$, where r is the radius of the domain. With these facts taken into consideration, the number of magnetoresistive elements cannot be greater than 6 - 8.

The object of the proposed invention is an increase in the level of the output signal of the magnetoresistive sensor. For this purpose, the magnetoresistor is made in the form of a multilayer structure in which magnetofilm elements, the light axes of which are parallel, are situated one underneath the other, are separated by insulating layers, and are series-connected by a conducting material through contact windows in the insulating layers, during which the first and last magnetofilm elements are connected to contact outlets.

USSR

UDC 681.326.3(088.8)(47)

MICROPROGRAM CONTROL DEVICE

USSR AUTHOR'S CERTIFICATE No 467351, FILED 25/08/72, PUBLISHED 3/11/75 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B309P]

ASTSATUROV, R. M., KONDRAT'YEV, A. P., and MAL'TSEV, N. A.

[Text] The proposed device contains a microprogram memory unit connected to an address register and a microcommand register, decoders connected with the microcommand register, a delay line, and logic circuits. With the aim of expanding the functional possibilities it contains a control unit with the duration of a microprogram cadence, whose inputs are connected with the corresponding outputs of the decoders and of the delay lines. The output of the control unit is connected to the synchronizing input of the address register and through the NOT circuit to the input of the delay line. Figures 2.

HUNGARY

UDC 621.377.623.22:681.327.63

OPTIMUM WRITING WORKING POINT OF MOVING-MAGNET MEMORIES

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 11, Nov 76 pp 334-336 manuscript received 23 Apr 76

NEMETH, Gabor, Dr, BME HEI [Budapest Technical University]

[Abstract] This article discusses for a thin memory layer the relationship between the writing current corresponding to the minimum magnetization-switchover and the sensitivity of the magnetic switchover against the basic parameters of the memory. Although the feedback effect (demagnetization) of the memory medium significantly affects the configuration and length of the magnetization-switchover that establishes itself in the course of writing, this factor is disregarded in the study to place special emphasis on the effects of magnetic and mechanical tolerances. The optimum value of the writing current, the sensitivity of the steepness of the writing space, and the effects of an increase in the writing current are discussed. Figures 4; references 6: 2 Hungarian and 2 Western.

EAST GERMANY

ASSIGNMENT OF THE REGISTER OUTPUTS TO THE OPERAND BUS IN CENTRAL PROCESSORS OF SMALL COMPUTERS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 9, 1976 pp 339-342 manuscript received 25 Sep 75

GREIFF, M., Chamber of Technology, Information Technology Section, Technical University, Dresden

[Abstract] The algorithm used for establishing a rational assignment of the register outputs to Operand Buses 01 and 02 selects the register to be assigned, establishes the already assigned registers of which the contents are to be coupled with the contents of the register to be assigned, and determines the manner in which the data are to be coupled (if the data are coupled in the addition unit, the register outputs are assigned to different operand buses, and if the data are coupled on the operand bus, the register outputs

are assigned to the same operand bus). The registers considered in this article are the accumulator, the storage data register, the sector register, the base register, the instruction counter, the index register, and the memory-address register. Ways for assignment in computers with sector addressing, with 1-bus and 2-bus structure are discussed. Examples are presented to illustrate that the method described provides optimum connection of the registers to the structure of the processing network. Figures 4; references 18: 8 German, 1 Hungarian, and 9 Western.

Certain Aspects of Motion Pictures
and Television

USSR

UDC 621.397.6.049.77

A MICROCIRCUIT DIGITAL-ANALOG CONVERTER FOR GENERATION OF A TV SIGNAL

Moscow TEKHNKA KINO I TELEVIDENIYA in Russian No 11, Nov 76 pp 59-61

MORGUNOV, A. N., VETLUGIN, YE. P. and MARININA, YE. D., Zhitomir Affiliate of Kiev Polytechnical Institute

[Abstract] The paper describes a digital-to-analog converter for TV signal generation that uses ICs of the 100 and 500 series with delay times of no more than 2.5 ns. The digit drivers are based on microcircuits of the same series as the digital input devices, making the circuit simple and reliable. Schematic diagrams are given of a single digit and of an eight-digit converter. The maximum output voltage of the converter is 0.512 V across a load of 5.1 k Ω ; the quantization step is 2 mV; maximum relative error is 0.2%. Figures 4; references 8 Russian.

USSR

UDC: 621.397.611 videomagnitofon

INVESTIGATION OF WAVE LOSSES AND NONLINEARITY IN A MAGNETIC VIDEO RECORDING CHANNEL

Moscow TEKHNKA KINO I TELEVIDENIYA in Russian No 11, Nov 76 pp 62-66

BESSUDNOV, R. P.

[Abstract] The paper gives the results of measurement of the amplitude-frequency and amplitude characteristics of a magnetic video recording channel as determined from the levels of the side components of a frequency-modulated signal. An examination is made of the variation in wave losses for the case of FM signal recording with vestigial upper or lower sideband. An examination is also made of the onset of nonlinearity in the recording process. It is found that wave losses depend on the kind of signal being recorded -- on the nature of its amplitude and frequency behavior. The presence of upper side components in the FM frequency spectrum increases losses on the lower side components. Strong nonlinearity of the recording process is indicated by the appearance of combination and "reconstructed" frequencies in the reproduced signal when the sum of two waveforms or an AM-FM waveform is recorded. Figures 5; references 7 Russian.

CSO: 1860

USSR

UDC 681.322.002.2(088.8)(47)

METHOD OF PRODUCTION OF MAGNETIC CORE BOARDS WITH PRINTED WIRING

USSR AUTHOR'S CERTIFICATE No 485497, FILED 10/04/73, PUBLISHED 27/11/75 in Russian

[From REFERATIVNYY ZHURNAL -- AVTOMATIKA, TELEMEXHANIKA I VYCHISLITEL'NAYA TEKHNIKA No 10, 1976 Abstract No 10B232P]

POKRYSHCHEVSKIY, L. B., ZUYEV, V. M., and RAKHOVSKAYA, M. F.

[Text] The proposed method is based upon the arrangement and fastening of magnetic cores between the lower and the upper base with successive completion of the windings and the connections between them by the printed wiring method. For simplifying and increasing the density of the wiring, the lower base of the plate with cylindrical plugs is made from two layers of different materials with openings.

The upper base with openings is made from the material of the lower layer of the lower base. A conducting layer with a low electrical resistance is applied upon the outer surfaces of the plate bases and the surfaces of the openings, the upper layer of the lower base of the plate is dissolved. Magnetic cores are set upon the respective conducting plugs. The faces of the conducting plugs are joined with the openings of the upper base. Electrical contacts between them are created, for example by galvanic welding. Then the volume between the bases of the plate is filled up by a compound. Figures 3.

HUNGARY / WEST GERMANY

AUTOMATIC DEPOSITION OF OPTICAL LAYERS

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 15 No 11, Nov 76 pp 327-331

HEINZ, B., Leybold-Heraeus, Hanau, German Federal Republic

[Abstract] Control systems, the methods of automated deposition of single and multiple optical layers, and practical experiences with automatically operating systems for the manufacture of layers and layer systems in a reproducible and economical manner were described. Satisfactory results can be achieved only if the starting conditions (including atmospheric humidity) are constant, if the lenses are treated prior to and in the course of vapor treatment, if the thickness of the vapor-deposited layer is monitored, if the layer formation is interrupted precisely when the $\lambda/4$ transition is reached, and if the cooling cycle is controlled. Manufacturing experiences with a system controlling these parameters indicate that the following standards can be met: Less than ± 3 nm deviation from the $\lambda/4$ value; about 1% layer-thickness constancy; 12-16 minutes cycle time; manufacture of 120 65-mm thick eyeglass lens coatings with a $\lambda/4$ layer on both sides by using a 640 mm diameter carousel; 100% yield. The deposition of systems of layers and the control of reactive vapor-coating for the preparation of multiple layers were briefly discussed. Figures 8; no references.

HUNGARY / WEST GERMANY

VACUUM EVAPORATION AND ITS SIGNIFICANCE IN THE ELECTRONIC INDUSTRY

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 15 No 11, Nov 76 pp 338-345

HEINZ, B., Leybold-Heraeus, Hanau, German Federal Republic

[Abstract] The author reviews the present status of vacuum evaporation and discusses the requirements of the electronic industry as they are today and as they are likely to be in the future. The following subjects are discussed: generation of high vacuum, construction of evaporating systems, effects of the quality of the high vacuum on the properties of the vapor-deposited layers, vapor sources, and application examples. The evaporating methods used in the electronic industry include resistance heating (sublimation, evaporation from coil or boat, flash method), induction heating (from crucible), and

electron-beam evaporation (stationary or rotating crucible, wobbling beam, atomization, diode, triode, and high-speed). New methods are more economical, especially since they permit replacement of costly materials with less expensive ones. Figures 10; tables 3; no references.

EAST GERMANY

TASKS AND PREREQUISITES FOR ENSURING THE RELIABILITY OF ELECTRONIC AND ELECTRIC-TECHNOLOGICAL PRODUCTS

East Berlin FERNMELDETECHNIK in German Vol 16 No 6, 1976 pp 185-187

MINDNER, D., Chamber of Technology, East Berlin

[Abstract] This article is the text of a paper delivered by the author at the 2d Scientific Conference of the Engineering College in Wismar, held 17-18 July 1976. The major factor which contributes to reliability of electronic and electrical products is good cooperation between the various parties who participate in the creation of the product. They are the supraordinate organs (government bodies, scientific institutions, suppliers, and so forth), production organs (product preparation, production, marketing, and so forth), and others. Their relationship is illustrated with a chart. Standards such as the DAMW [German Metrology and Materials Testing Bureau] VW 1068 specify many reliability-related matters. Factors contributing to reliability include: assigned responsibilities, reliability teams, guidelines, training, support, reliability-assurance systems, reliability-minded development and design, product standards, scientific research, and planning. Figure 1; references 8: all German.

HUNGARY / WEST GERMANY

MANUFACTURE OF THIN-LAYER RESISTORS AND CAPACITORS BY SPUTTERING

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 15 No 11, Nov 76 pp 321-326

PATZ, U., dr, Leybold-Heraeus, Hanau, German Federal Republic

[Abstract] The critical parameters of layer separation are examined with the aim of establishing the optimum methods for manufacturing passive components such as resistors and capacitors of thin-layer circuits. The apparatus used

for making these components was described. It consists of the following modules: rack; pump system; etching, cooling, or substrate-rotating unit; work-space; feeding and storage unit; drive unit; gate; forwarding unit; substrate holder; cathode system; etching anode; and substrate-heating or gas-discharge cleaning unit. The operations involved in making the components were described. They are: pretreatment, layer deposition, cooling, and finishing. The module system described is versatile and capable of change to suit a variety of operating conditions. Figures 11; table 1; references 16: 1 German and 15 Western.

EAST GERMANY

USE PROBLEMS WITH PLASTIC-INSULATED SWITCHING DEVICES IN THE BACK-WIRING OF ELECTRONIC INSTRUMENTS

East Berlin FERNMELDETECHNIK in German Vol 16 No 6, 1976 pp 197-200

SCHEEL, W., Chamber of Technology, East Berlin, and ALBRECHT, H.-J., Brandenburg, Electronics Section, Humboldt University, East Berlin

[Abstract] Introduction of the 2.5 mm grid in the wiring panel requires switching wires of small diameter, thin insulation, and superior electrical, thermal, and mechanical properties. Measurements are needed to establish the mechanical values which determine the range within which the performance of the insulator is satisfactory. Determination of the cutting power is suitable for this purpose. A method for this is described. The results of this determination must be considered in designing the wiring, and also in carrying out the wiring operation. Unlike in earlier methods, the method described in this article employs a cutting radius of 17.5 μm and a cutting angle of 90°. It provides data for performance in the 25°C to 70°C temperature range. This approach contributes to the elimination of the risk of short circuits and secondary electricity circuits. Figures 8; table 1; references 6: all German.

EAST GERMANY

A NEW DEVICE FOR WINDING PRECISION COILS

East Berlin ELEKTRIE in German Vol 30 No 5, 1976 pp 254-255

SCHLESOK, Wolfgang, graduate physicist, staff scientist, and FLUGEL, Wolfgang, laboratory technician, ASMW [Bureau for Standardization, Metrology, and Materials Testing]

[Abstract] The device described winds coils with winding distances not deviating from the nominal level by more than 10 μm , prevents the contamination of the coil with iron particles, and eliminates the need for combing of the coils after winding. The wire to be wound is taken from supply rolls made of wood or ceramic material and is fed by a variable transmission which is mounted on a sled moving in a reciprocating manner on two tracks along the body over which the wire is wound. The wire is maintained under constant tension in the process. Coils may be wound over bodies up to 1300 mm in length and 330 mm in diameter; the wire may be between 0.5 and 2 mm in diameter. Figures 2; references 2: both German.

EAST GERMANY

RELIABILITY ASSURANCE BY STANDARDS

East Berlin ELEKTRIE in German Vol 30 No 5, 1976 pp 242-245

SCHMIDT, Frank, dr of engineering, staff scientist, Reliability Department, Bureau for Standardization, Metrology, and Materials Testing of the German Democratic Republic [ASMW]

[Abstract] TGL [East-German Standard] 26,096/03, using an algorithm for the selection of reliability parameters, is a document based on Soviet studies promulgated to improve the reliability of East-German products in terms of end-use requirements. It uses use-performance data, production-process parameters, and special test designs to obtain these parameters. Subsequently to be issued standards will describe some more frequently used test designs. The ASMW actively participates in a movement aimed at establishing standards which is part of an overall project for product reliability improvement in the industry as a whole. The project covers both newly developed products and processes presently being used for the manufacture of current articles. There are already numerous Soviet standards on these subjects, including standards covering products and procedures. They are considered in arriving at the East German standards in this area. Figure 1; references 33: 4 German and 29 Russian.

EAST GERMANY

VALVE KIT FOR RATED PRESSURE 32 MN/m^2 : A NEW GENERATION OF HYDRAULIC GUIDANCE AND CONTROL DEVICES. PART 2

East Berlin AUTOMATISIERUNGSPRAXIS in German Vol 13 No 8, Aug 76 [Supplement to MESSEN STEUERN REGELN Vol 19 No 8, Aug 76] pp 185-188

STAMMER, A.

[Abstract] This is Part 2 of a series, which will be continued (Part 1 was published in No 6 of the 1976 volume of this journal). Part 2 describes pressure valves, closing valves, and valve combinations. The pressure valves are designed primarily for insertion in boreholes and as parts of valve assemblies. Valves are available with fine adjustment, with arrestor adjustment, and with lockable adjustment. Versions include pressure reducing valves, pressure limiting valves, and pressure holding valves. The closing valves include pneumatic adjusting valves, mechanical adjusting valves, and electromagnetic adjusters, each for either pulse or ram operation. Combinations include segmental assemblies of individual assemblies and single assemblies. The assemblies feature small dimensions and weight, pressure limitation at the oil-entry lid, free flow in the mid position through controlled pressure valve, manual adjustability, ability to control two users, and ability to be combined with a check valve. Some applications are discussed. Figures 26; references 1 German.

EAST GERMANY

STATUS AND TRENDS OF TECHNOLOGICAL PROCESSES IN ELECTRONICS

East Berlin FERNMELDETECHNIK in German Vol 16 No 6, 1976 pp 190-193

WALTHER, L., and BARTSCH, P., Chamber of Technology, Dresden

[Abstract] This article is the text of the authors' lecture delivered at the 4th Scientific Conference of Mittweida Engineering College, held 25-27 May 1976. It describes the distribution of the work time in the manufacture of a typical electronic test instrument of average performance, the distribution of the work time in typical electronic components, and the distribution of the work time in a consumer-electronic device. Present trends in the electronic industry are toward the use of 3rd-generation components. The use-value:work

requirement ratio increases approximately fourfold when stepping from one generation to the next. Testing operations are generally backward in terms of state of development compared to other areas of the industry. Too much work is expended in wiring, and joining operations consume almost half of the work effort in the manufacture of the final product. There is a trend toward the increased use of chemical and physical methods in component technology. In addition to better training (which is realized), the task of industry is to carry out improved rationalization and intensification of its operations. Tables 7; references 6: all German.

USSR

UDC 621.373.42.018

USE OF PARTIAL MODELS IN THE QUANTITATIVE OPTIMIZATION OF LOW-POWER
MICROWAVE ELECTROVACUUM DEVICES

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10,
Oct 76 pp 43-48 manuscript received 15 Mar 76

BOBROVSKIY, YU. L.

[Abstract] The optimization of design and performance parameters is a major problem in the engineering of low-power microwave devices. The conventional two stages and the first establishment of the appropriate trends and then calculations based on partial models, one for each influencing factor and all combined for a global evaluation. The applicability and the validity range of such partial models are examined here, after the fundamental concept of "model error" has been defined in terms of the relation (generally nonlinear) between an influencing factor and a sought parameter, this relation being variable in reality but assumed constant for practical purposes. As an illustration of the problem serves the simple example of interaction between the microwave electron beam and the electric field in the grid-cathode gap, this interaction and thus the efficiency of the device being influenced mainly by the space charge, the grid porosity, and the power loss in the tank circuit. The physical limits are established for each respective partial model, and these must be taken into consideration if not only the calculations but also the device performance are to be reliable. Figures 3; references 11 Russian.

USSR

UDC 621.374:621.375

EVALUATING THE PARAMETERS OF A VOLTAGE-TUNABLE MAGNETRON

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10,
Oct 76 pp 80-87 manuscript received 11 Apr 75; after revision, 20 Aug 75

KOROSTELEV, G. N. and ZOTOV, YE. P.

[Abstract] The interaction of a microwave electron beam with the fields (electric and magnetic) in a voltage-tunable magnetron with a "cold" cathode was analyzed by analog simulation of the nonuniform field profiles and digital simulation of the dynamic characteristics, in order to explain the effect of the device geometry and of the operating mode on the efficiency and the noise level. The results indicate that the noise level will be reduced by a lower space-charge density and a more uniform distribution of kinematic parameters within the electron beam entering the space-charge region. Figures 5; tables 1; references 11: 9 Russian, 2 Western.

USSR

UDC 621.385.6

SEGMENTAL ELECTROSTATIC MICROWAVE AMPLIFIERS OPERATING WITH CYCLOTRON WAVES

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10,
Oct 76 pp 74-79 manuscript received 16 Jun 75; after revision, 25 Nov 75

BONDAREV, A. S. and KANTYUK, S. P.

[Abstract] The performance of electrostatic microwave amplifiers operating with cyclotron waves is analyzed in terms of signal gain and dynamic range. Loss of synchronism, which limits the performance is caused by amplification of the intrinsic electron motion, can be avoided best by segmentation of either the device structure or the drift-potential profile. The first method is simpler, but feasible only in the case of low-power amplifiers. Figures 1; references 2 Russian.

USSR

UDC 621.385.6

BANDWIDTH OF TRAVELING-WAVE TUBES AND ESTIMATED MAXIMUM IMPROVEMENT OF THE BANDWIDTH ATTAINABLE BY OPTIMIZATION OF THE BUNCHING STAGE

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10,
Oct 76 pp 114-115 manuscript received 18 Nov 74; after revision, 14 Apr 75

IVANOVA, N. N. and FILIMONOV, G. F.

[Abstract] The bandwidth of a traveling-wave tube is found to be about four times larger with a wide-band delay line ("clover leaf") than with a narrow-band delay line (modified helix). In the first case the bandwidth is limited by the natural constraints on optimum interaction between the electrons and the fields, so that the margin for improvement is much smaller here (typically 30%) than in the second case (typically 100%). Optimization of the modulating (bunching) stage is, therefore, effective and worthwhile particularly in the case of narrow-band traveling-wave tubes. Figures 2; references 2 Russian.

USSR

UDC 621.385.6

ANALYSIS OF SOLID-PHASE INTERACTION BETWEEN GARNET-FERRITES AND METALS DURING THE MANUFACTURE OF MICROWAVE ELECTRON DEVICES WITH FERRITES MOUNTED INSIDE THE VACUUM TUBE

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10, Oct 76 pp 111-113 manuscript received 15 Sep 75

KONYUSHKOV, G. V., ZOTOV, B. M., and PLYSHEVSKIY, A. A.

[Abstract] The performance parameters of microwave electron devices can be improved by the technique of mounting a ferrite element inside the vacuum cavity. The success of this technique depends, however, on stable and heat resistant products of interaction between such a ferrite and the metallic elements it makes contact with. In practice the best results have been obtained by diffusion welding of yttrium-gadolinum garnet ferrites (ceramic phase) to nonmagnetic metals (copper, molybdenum, titanium). The results of a study concerning the mechanism and the thermodynamics of this process suggest that an intermediate layer forms at the welded joint, a solid solution with not only a variable concentration but also a gradually changing chemical bond and composition. Such a gradual transition seems to ensure a welded joint with copper mechanically as strong as the ferrite and capable of carrying heavy thermal loads. References 7 Russian.

USSR

UDC 621.385.6

STABILITY ANALYSIS OF M-TYPE ELECTRON BEAMS SUBJECT TO STATIC PERTURBATIONS

Kiev IZVESTIYA VUZOV SSSR - RADIOELEKTRONIKA in Russian Vol 19, No 10, Oct 76 pp 103-106 manuscript received 14 Oct 75

KULIKOV, M. N., SAFAROVA, YE. A., and STAL'MAKHOV, V. S.

[Abstract] When an electron beam moves through static crossing fields (electric and magnetic), it may become unstable because of aperiodic perturbations at the inlet to the interaction zone. The stability of an M-type electron beam is analyzed here, in the case where the inlet conditions deviate from the optimum which ensures a rectilinear path through uniform crossing fields. The beam axis is assumed initially curvilinear, the truncated cycloidal trajectory is represented by a Fourier series, and the final solution is obtained in the form of Hill's equation. Such a beam is found to remain stable under not too large perturbations at the inlet. Figures 1; references 3: 2 Russian, 1 Western.

USSR

UDC 62-83:622.271.4.001.24

DESIGN OF THYRISTOR-EXCITERS FOR ELECTRIC DRIVES OF EXCAVATOR MECHANISMS

Moscow ELEKTRICHESTVO in Russian No 11, Nov 76 pp 28-31

BUL', YU. YA. and SIMONOV, YU. V., Moscow

[Abstract] The design of an exciter is dictated not only by the necessary voltage and current levels but also by the need for limiting the transients. Of interest in the application to excavator mechanisms (digger, dragline hoist, tilter) are thyristor inverters serving as exciters for their electrical drives. Accordingly, the fundamental equations of mechanical and electrical performance of a "voltage generator - motor" set during starting and braking as well as of a "current generator - motor" set during changes in flux are analyzed as a basis for establishing the exciter requirements. The appropriate thyristor-exciter is then designed in seven steps, by calculating 1) its time constants, 2) the rate of change of flux and the period of flux change (if necessary, also the period of free vibrations of the mechanism), 3) the transient overvoltage factors, 4) the maximum excitation voltage at the inverter output, 5) the maximum voltage per exciter winding turn, 6) the number of turns in the exciter winding, and 7) the necessary exciter power. This procedure is illustrated on a typical separate exciter for a 220 V 1450 kW generator. Figures 1; references 2 Russian.

USSR

UDC 621.313.333.048.004.65

FAILURE RATE OF THE INSULATION IN ELECTRIC MOTORS USED AS ACCESSORIES IN ELECTRIC POWER PLANTS

Moscow ELEKTRICHESKIYE STANTSII in Russian No 11, Nov 76 pp 34-35

VOL'POV, K. D. and BELYY, YU. V., "Donbassenergo"

[Abstract] The reliability of operation of electric power plants depends largely on the failure-free operation of its electric accessory motors. The latter, in turn, operate here under particularly severe ambient conditions characterized by high temperature and humidity, dusty air, frequent transients, vibrations, etc. All these factors influence the insulation life and statistical data indicate, moreover, that about 70% of all motor failures occur in the stator winding insulation. The mean annual failure rate in operation is about 4%, which is about 2.5 times higher than the reject rate in qualifications tests. An analysis of the various categorized types of insulation failure in the various types of pump and fan motors suggests that the failure rate can be decreased appreciably by a better plant maintenance and a better

quality of the motor insulation. It had been found, for instance, that mica tape does not ensure a higher reliability and should be replaced by a more elastic and overall resistant grade. Qualification tests should be scheduled more rationally and should cover more essential items, so that subsequent operational failure of units initially not rejected can be avoided. Finally, the overvoltage protection of motors should be improved and matched with the insulation characteristics. Tables 2.

USSR

UDC 621.313.333.001.4

ANALYSIS OF GENERAL PRINCIPLES IN MOTORS OF THE 4A SERIES WITH POWER OF 60-650 KW

Moscow ELEKTROTEKHNIKA in Russian No 10, Oct 76 pp 18-20

ALIKHANYAN, K. A., candidate of technical sciences, DADIVANYAN, F. P., engineer, and MANUKYAN, L. A., candidate of technical sciences

[Abstract] An approximate model is developed and analyzed in the theory of design of a series of low-power induction motors. Basic theoretical governing principles are established in the series. A theoretical basis is given for certain specific distinguishing features of the characteristics and design of low-power induction motors. An analysis is made of some parameters of the smaller representatives of the 4A series. The proposed theoretical model might be useful in design work and in the standardization of low-power induction motors. Figures 4; references 3 Russian.

USSR

UDC 621.313.333.001.4

PLANNING RESEARCH AND DEVELOPMENT OF A LONG-RANGE SERIES OF INDUCTION MOTORS

Moscow ELEKTROTEKHNIKA in Russian No 10, Oct 76 pp 8-10

STREL'BITSKIY, E. K., doctor of technical sciences, KRAVCHIK, A. E., candidate of technical sciences and PETRENKO, V. G., engineer

[Abstract] The authors propose a systems approach to setting up a plan for developing series of induction motors enabling an interrelated examination of all jobs with consideration of the extent to which they meet the goals of the series being developed. The main stages of the systems approach are: setting up a hierarchical tree of the goals of the complex of research projects; formation of parameters -- technical specifications, technical and economic analysis of the influence that the parameters have on the components of the tree of goals, and setting up a list of jobs to be

included in the calendar plan. The effect of the research is determined by minimizing the goal function of the series (national economic expenditures) with satisfaction of certain limitations. The systems properties required by the research are examined and the procedure for setting up the research plan is outlined. Tables 2.

USSR

UDC 621.313.333.002.72.001.4:65.011.54

MECHANIZATION OF ASSEMBLY, INSPECTION AND TESTING IN MASS PRODUCTION OF INDUCTION MOTORS

Moscow ELEKTROTEKHNIKA in Russian No 10, Oct 76 pp 33-36

BRONNIKOV, I. S., engineer, MIKHAYLENKO, N. S., engineer, VOLOBUYEV, V. N., engineer, KOSTROMIN, V. G., candidate of economic sciences, YEPIFANOV, V. S., candidate of technical sciences, and KOROLEVA, L. K., engineer

[Russian abstract provided by the source]

[Text] The paper describes mechanization facilities developed by the VNIITelektromash Institute for mass-producing induction motors. An examination is made of the design decisions implemented in carrying out the main operations of general assembly of the motors, as well as electrical inspection tests of the stators and the assembled motors. Figures 3.

USSR

UDC [621.313.333:62-503.55].001.3

SYSTEMS APPROACH TO QUALITY CONTROL IN MAKING INDUCTION MOTORS

Moscow ELEKTROTEKHNIKA in Russian No 10, Oct 74 pp 52-54

ZHUKOV, N. A., engineer, IGNATOVICH, V. M., engineer, MURAVLEV, A. P., engineer, and MURAVLEV, O. P., candidate of technical sciences

[Abstract] Based on a systems approach, a model is developed for ensuring quality in the manufacture of induction motors. This model quantifies the relative importance of elements that determine quality on different levels. Numerical values are found for the coefficients of relative importance for the third and fourth sizes of the A02 induction motor series. The proposed coefficients of relative importance give a scientific basis for development of a quality control system. Tables 6; references 3 Russian.

USSR

UDC [621.315.61:621.313.334A].001.5

NEW ELECTRICALLY INSULATING COMPOSITION MATERIALS AND IMPREGNATING COMPOUNDS
FOR SERIES 4A MOTORS

Moscow ELEKTROTEKHNIKA in Russian No 10, Oct 76 pp 45-49

KAPLUNOV, I. YA., candidate of technical sciences, SAFONOV, G. P., candidate
of physical and mathematical sciences, and PAK, V. M., engineer

[Russian abstract provided by the source]

[Text] The paper gives the results of research and development of isoflex
and imidoflex composition materials based on polyethylene terephthalate and
polyimide films, and also KP-34 solventless impregnating compound. Recom-
mendations are made on using the materials. Figures 6; tables 3; references
19: 14 Russian, 5 Western.

USSR

REGULATING AUTOTRANSFORMERS

Moscow PROMYSHLENNAYA ENERGETIKA in Russian No 11, Nov 76, p 62

[Abstract] The Electrical Engineering Plant at Tol'yatti has master-
ed the output of regulating autotransformers of Types AOSN, AOMN,
ATSN, ATMN and ATSNP instead of the variators (voltage regulators)
of Types RNO and RNT which were produced earlier by the Stavropol'skiy
Plant "Elektroavtomatika" and the Kanashskiy Plant Of Electrical
Loaders. The technical characteristics of the new autotransformers
are presented. These autotransformers are intended for smooth regul-
ation of the voltage of a-c current of 50 and 60 Hz industrial freq-
uency. They are used during all kinds of operations in electrical
engineering laboratories, e.g., for supply of step-up transformers
in tests of safety cutouts, regulation relays, automatic machines,
etc., as well as in industrial circuits for regulating the temper-
ature in muffle furnaces, in thermostats, etc. Tables 1.

HUNGARY

UDC 621.315.211.9.027.72/735:546.212:621.315.616.9:678.
742.2

POLYETHYLENE-INSULATED 20.2/35 kV WATER-FILLED CABLE

Budapest ELEKTROTECHNIKA in Hungarian Vol 69 No 7, Jul 76 pp 264-266 manuscript received Mar 75

KARDOS, Gyorgy, graduate mechanical engineer, candidate of technical sciences, head of the Research Institute, and MAZURA, Janos, graduate electrical engineer, research engineer, Hungarian Cable Works

[Abstract] The cable discussed in this article was described by G. Kardos in ELECTRICAL TIMES, 28 December 1967, pp 1021-1022. The article describes the 20.2/35 kV cable made at Hungarian Cable Works. The cable is filled with water that is free of air bubbles (achieved by prior evacuation) so that no "water tree" can develop); entry of air into the cable is prevented by using the appropriate polyethylene formulation and extrusion method. Two experimental lines with this cable were laid in the spring of 1976 in the Miskolc area; they have a total length of 746 meters. Their performance under various operating conditions was described; the performance was judged satisfactory. No "water tree" development was evident as a result of the joint effects of outside water and a 50 Hz a.c. voltage. It also became evident that the thickness of the polyethylene sheath does not necessarily determine durability in service. The minimum thickness of the cables made is 3.7 mm. Further plans include the development of a cable with circulating water for improved cooling. Figures 4; table 1; references 5: all Western.

EAST GERMANY

COMPARATIVE EVALUATION OF THE CURRENT LOADABILITY OF TRIACS AND THYRISTORS IN CONVERTER CIRCUITS

East Berlin ELEKTRIE in German Vol 30 No 7, 1976 pp 362-367

MAUERSBERGER, Christian, dr of engineering, department head, Department of Science and Engineering, Switching Electronics Combine State Enterprise, Dresden

[Abstract] The current loadability of triacs and thyristors is examined and comparatively evaluated. The comparison is based on current converter circuits

which perform identical functions under the same input and output conditions. The power section of the circuit is modified to permit triacs and thyristors, respectively, to function. The purpose of the study was to obtain technical and economic comparison data. The results, presented in detail, indicate that under certain conditions equivalent triacs may be used to replace comparable types of thyristors in terms of equal loadability. The equivalence in these cases applies over the entire practical operating-time range. Enlarged cooling systems may be needed for the triacs if two are used instead of a single thyristor (used as a.c. and d.c. converter). Although there may also be a need for further circuit modifications to achieve equivalence in terms of short circuit, short-term overload, and/or long-term operation conditions, the replacement is feasible in all instances. Practical tests confirmed the validity of the theoretical conclusions. Figures 4; tables 3; references 12: 3 Russian, 1 Western, and 8 German.

EAST GERMANY

ON THE CALCULATION OF CRYSTAL EXCESS TEMPERATURE IN SEMICONDUCTOR COMPONENTS IN THE DRIVE TECHNIQUE

East Berlin ELEKTRIE in German Vol 30 No 6, 1976 pp 333-335

NIKOLOFF, Ivan, dr of engineering, group leader, and GLOEDE, Manfred, graduate engineer, development engineer, Vehicle Development Department, Locomotive Construction and Electrical Engineering Works Combine State Enterprise "Hans Beimler," Hennigsdorf

[Abstract] Programs for the calculation of crystal excess temperature under load with square pulses (constant pulse amplitude and linear pulse-length change; constant pulse length and linear pulse-amplitude change; or linear pulse-length and pulse-amplitude change) were developed. They permit the development of data for designing adjusting components in power electronics. Relatively short computation times are needed and optimization in thermal terms can be easily accomplished. The technique also permits consideration of the switching losses under typical load conditions. The programs are written in ALGOL-60 (R 300 version). Figures 5; references 6: 4 German, 1 Czechoslovak, and 1 Western.

EAST GERMANY

THE GSAS 1-123 GAS-INSULATED SWITCHING SYSTEM IN ACTUAL NETWORK USE

East Berlin ELEKTRIE in German Vol 30 No 7, 1976 pp 349-353

WECKEND, Theo, graduate engineer, head of the Switching Device Development and Design Department, HOJDEM, Walter, engineer, head of the Switching Device Design Subdepartment, and MUELLER, Ottmar, dr of engineering, staff scientist, Switching Device Design Subdepartment, Karl Liebknecht Transformer Works State Enterprise, East Berlin

[Abstract] This article describes the performance of the first GSAS 1-123 gas (SF₆) insulated switching system for 123 kV installed at the Glauchau Transformation Works. The system is modularly built and has a rated branching current of 1250 A (rated collector rail current of 1600 A), a rated shutdown current of 25 kA, rated shock current of 63 kA, and a rated short-term current of 25 kA. The insulation space is monitored by contact manometers, and means are provided for thermal expansion and contraction compensation. Safety provisions include means to ensure that any breakthrough into the high-voltage portion of the capsulation causes development of a light arc which in turn causes a gas-pressure increase. All provisions of IEC Publication 517 are complied with. Before shipment, the system was tested for stationary lightning voltage, stationary a.c. voltage, d.c. voltage, a.c. voltage, mechanical performance, voltage drop, and other relevant characteristics. On location, tests were carried out for gas-tightness, gas moisture, functional performance of the ground protection, functional performance of the peripheral devices (minimum compressed air compressor KDVA-1 and maintenance system WG-2), and the insulation of the high-voltage unit. The test voltage was 123 kV. Figures 7; references 2: both German.

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