010087

JPRS 68344

9 December 1976

USSR

EAST EUROPE

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

ELECTRONICS AND ELECTRICAL ENGINEERING

No. 25

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

Reproduced From
Best Available Copy

20000302 139

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22151. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 68344

9 December 1976

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

ELECTRONICS AND ELECTRICAL ENGINEERING

No. 25

BIBLIOGRAPHIC DATA SHEET	1. Report No. JPRS 68344	2.	3. Recipient's Accession No.
4. Title and Subtitle USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS - ELECTRONICS AND ELECTRICAL ENGINEERING, No. 25			5. Report Date 9 December 1976 6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address As above			13. Type of Report & Period Covered 14.

15. Supplementary Notes

16. Abstracts

The report contains abstracts on electronic materials, components, and devices, on circuit theory, pulse techniques, electromagnetic wave propagation, radar, quantum electronic theory, development and devices, miniaturization techniques on electric power machinery, power transmission, and nuclear power developments.

17. Key Words and Document Analysis. 17a. Descriptors

USSR
Eastern Europe
Antennas
Electromagnetic Spectra
Network Synthesis
Instruments
Lasers

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 9F, 9C, 9A, 20N

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
Unlimited Availability Sold by NTIS Springfield, Virginia 22151	UNCLASSIFIED	104
	20. Security Class (This Page) UNCLASSIFIED	22. Price

FORM NTIS-35 (REV. 3-72)

THIS FORM MAY BE REPRODUCED

USCOMM-DC 14952-P72

JPRS 68344

9 December 1976

USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

ELECTRONICS AND ELECTRICAL ENGINEERING

No. 25

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.

Photoreproduction of foreign-language sources may be obtained from the Photoduplication Service, Library of Congress, Washington, D. C. 20540. Requests should provide adequate identification both as to the source and the individual article(s) desired.

CONTENTS

	PAGE
Amplifiers	1
Antennas	2
General Production Technology	4
Communications, Data Transmission	5
Electron-ion Units; Emission	25
Electromagnetic Wave Propagation; Ionosphere, Troposphere	26
Instruments and Methods of Measuring	30
Quantum Electronics, Lasers, Masers, Holography, Quasi-optical	41
Microelectronics and General Circuit Theory and Information	44
Photoelectrics, Photoelectric Effect	54
Radars and Radio Navigation	55
Semiconductors and Dielectrics; Luminescence; Solid State	64
Oscillators, Generators and Modulators	69
Theoretical Science, Engineering and Technology	72
Components and Circuit Elements Including Waveguides and Cavity Resonators	75
Electrical Engineering Equipment and Machinery	84
Power Systems	86
Cryogenics and Superconductivity	88
Certain Aspects of Computer Hard and Soft Ware	89
Certain Aspects of Motion Pictures and Television	102

[III - USSR - 21-E S & T]

USSR UDC 621.375:621.382

GAVRILOV, A. N., doctor of technical sciences, AGAFONOV, V. V., candidate of technical sciences and SOLOV'YEV, V. S., engineer

TUNABLE SELECTIVE AMPLIFIER BASED ON INTEGRATED MICROCIRCUITS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 7, 1976 pp 43-44

[Abstract] The authors are concerned with using rapid correlators to analyze random signals and find that as a rule it is necessary to have an input amplifier with a large coefficient of amplification and high input resistance; this is because the signals taken from the counters have a value on the order of fractions and units of a millivolt and for the normal operation of the correlator it is essential usually to have signals on the order of 1 V. The authors give the frequency characteristics of the amplifier for different switch positions. The amplifier is used in a two-channel version and operates in conjunction with the correlator. Figures 3.

1/1

USSR UDC 621.391.2:621,396.96

GUSEV, A.V., and RUDENKO, V.N.

CONCERNING THE OPTIMUM STRATEGY FOR MEASURING SMALL DISTURBANCES OF A GRAVITATIONAL ANTENNA

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1865-1873 manuscript received 15 Jul 75

[Abstract] The paper considers the measurement of small disturbances of a test body in connection with problems of an increase of sensitivity of gravitational antennas. The following items are discussed: 1) Gravitational detector (GD) with passive converter; 2) GD with parametric converter; 3) Optimum filtering for GD with parametric sensor [datchik]; and 4) Antenna with phase detector. It is shown that use of phase detection for an antenna with a parametric converter makes it possible to reduce considerably the limiting value of the intensity of the gravitation radiation which is detected. The authors are sincerely grateful to V.B. Braginskiy, A.A. Belov, A.B. Manukin and V.I. Panov for stimulating discussions and M.Ye. Gertsenshteyn and K.K. Likharev for checking the principal formulas. References 30: 20 Russian; 10 Western.

1/1

USSR

PERESLAVTSEV, I. B., Chief of the Kuybyshev ORTPTs [expansion not known]

TELEVISION PROGRAM RECEPTION ON HEIGHT-DIVERSITY RECEIVING ANTENNAS

Moscow VESTNIK SVYAZI in Russian No 8, Aug 76 pp 26-27

[Abstract] A brief description of an antenna system with heightwise spacing between antennas to enhance reception of television broadcasts by the most remote low-power relay stations. In the proposed system the main antenna is supplemented by a "wave channel" antenna closer to the ground. The horizontal spacing between antenna supports is 150 m, the main tower is 75 m high, and the auxiliary support is 16 m high. The details of the auxiliary antenna are shown in a diagram, and the balancing and matching unit is described. Installation of such a system at a relay station 110 km from the main broadcasting studio has resulted in practically uninterrupted relay transmissions for 80% of the time. Figures 4.

1/1

EAST GERMANY

HAUFERT, R., SCHWARZ, J., FOERSTER, TH., WIENER, A., and BETTAC, H. D., High-Voltage Engineering Construction State Enterprise, Karl-Marx-Stadt, and Institute of Electronics, Academy of Sciences of the German Democratic Republic, Neustrelitz Branch

REALIZATION OF AN ANTENNA CONTROL PROBLEM ON THE BASIS OF THE NUMERICAL POINT-DISTANCE CONTROL NC 470

East Berlin AUTOMATISIERUNGSPRAXIS in German Vol 13 No 7, Jul 76 (supplement to MESSEN-STEUERN-REGELN in German Vol 19 No 7, Jul 76) pp 162-165

[Abstract] The antenna-control system described and illustrated (with photograph, drawings, block diagrams, and specification charts) consists of the NC 470 control system (developed at the High-Voltage Engineering Construction State Enterprise), an interface unit, a timer system, a measuring system, and a process computer system (PRS-4000). It is suitable for the execution of all antenna-control tasks encountered in a modern ground station. Information may be entered on-line or by perforated tape. The measuring system determines the antenna position. The program system for satellite observations was described. Figures 4; references 10: 3 Western and 7 German.
1/1

USSR UDC 007:62-192

FINKEL'SHTEYN, YEKHEZKEL' YAZEPOVICH

PARAMETRIC ESTIMATES OF RELIABILITY

Riga PARAMETRICHESKIYE OTSENKI NADEZHNOSTI in Russian, Zinatne, 1975 196 pp

[Excerpts] This monograph is dedicated to one trend in the area of reliability testing of elements. The purpose of the investigation performed is the creation of methods for determination of groups of elements with high reliability based on consideration of the physical peculiarities of the structure of the elements studied before the beginning of their use. Primary attention is given to the construction of inequalities for the probability of failure of elements using a number of numerical constants which are functional distributions of the class of unreliable elements. The book is intended for engineers, graduate students, scientific workers involved in theoretical and applied problems of element reliability testing. The reader must have a familiarity with mathematics up to the level taught at a technical Vuz. 79 figures; 52 references.

1/2

USSR

FINKEL'SHTEYN, YEKHEZKEL' YAZEPOVICH, PARAMETRICHESKIYE OTSENKI NADEZHNOSTI, Zinatne, 1975 196 pp

CONTENTS

Chapter I.	One-dimensional Estimates of Probability of Failure	9
Chapter II.	Inequalities for Distribution Functions	75
Chapter III.	Criteria and Rules for Separation of Area of Elevated Reliability	119
Chapter IV.	Multidimensional Estimates of Reliability	140

2/2

USSR

FABIYA, S. A., Deputy Chief of the Simferopol' Intercity Exchange Office and TERESHCHENKO, N. A., electrician

A UNIT FOR CONNECTING TELEGRAPH EQUIPMENT TO THE TAPE PERFORATOR CONTROLLER IN AUTOMATIC INTERCITY EXCHANGE OFFICES

Moscow VESTNIK SVYAZI in Russian No 8, Aug 76 pp 19-22

[Abstract] The article gives details on the UKP-TA adapter developed by technicians at the Simferopol' Intercity Exchange Office. The unit is designed for connecting telegraph equipment to a perforator controller so that telegraph tape can be used in place of punchcards to keep track of intercity telephone traffic in automatic exchange offices. This work was made necessary by the shortage of punchcards and by the unreliable operation and lack of spare parts for the PD-45-2 automatic keypunch equipment at the Simferopol' Intercity Exchange Office. In its first year of use the unit has saved a total of 6338 rubles 50 kopecks. Figures 3.

1/1

USSR

TARNOPOL'SKIY, V. L.: KONIIS [Kiyev Branch of the Central Scientific-Research Institute of Communications]

TVU-12M TIME-DIVISION MULTIPLEX TELEGRAPH EQUIPMENT

Moscow VESTNIK SVYAZI in Russian No 8, Aug 76 pp 17-19

[Abstract] A brief outline of the design and functions of the TVU-12M and URAL multiplex equipment. The TVU-12M system forms groups of telegraph connections in a peripheral link (municipal and suburban service). This equipment works on the time-division multiplex principle with pulse-amplitude modulation, providing up to 12-channel transmission. Both teletype and synchronous signals can be handled in any codes at rates up to 200 bauds. The multiplexed line can be passed in tandem through several exchange offices. The system includes regenerators for use where the distance between terminal points is excessive. A diagram is given showing the operation of a TVU-12M system with two terminal points (sending and receiving). The URAL system is designed for operation with TVU-12M equipment to enable independent simultaneous transmission of discrete data and telephone conversations over two-conductor subscriber lines without coil-loading or repeater equipment. Operation is explained and a block diagram and general specifications are given. Figures 2.

1/1

EAST GERMANY

KUNZMANN, K., Chamber of Technology, Institute of Communications Technology, East Berlin

PLUG-IN CONNECTORS FOR CIRCUIT BOARDS IN TELEPHONE EXCHANGE TECHNOLOGY

East Berlin FERNMELDETECHNIK in German Vol 16 No 5, 76 pp 173-175

[Abstract] The article discusses the selection of plug-in connectors for circuit boards according to economic and reliability criteria, and then presents information about the unified flat-plug-in connector system of the German Democratic Republic [EFS]. This system encompasses direct and indirect connectors for use in ESER [Unified Computer System] units and the EGS [Unified Transmission System] units. Insofar as telephone exchange technology is concerned, the most important units of the system are: multiple-pole indirect circuit-board plug-in connectors as specified in TGL [East-German Standard] 1933/01 for solder and wirewrap (up to 87 poles, 88 by 8.5 by 13.5 mm) and the combination plug-in connectors as specified in TGL 29,331/06 for solder and press connection (up to 27 low-frequency contacts, 88 by 13.5 mm). Figures 3; table 1; references 3: all German.

1/1

EAST GERMANY

ROLLMANN, W., KDT [Chamber of Technology], East Berlin

TELEPHONE STATISTICS (AS OF 1 JANUARY 1975)

East Berlin FERNMELDETECHNIK in German Vol 16 No 5, 76 pp 164-167

[Abstract] Tabulated information is presented about telephones and telephone traffic in 32 countries of Europe, North America, Australia, the Near East, and New Zealand. The information is presented to indicate the status as of 1 January 1975 and to show changes in numbers and in terms of rate from the preceding year. The number of telephones per continent and country, per 100 residents per country, and per area is shown. Data are presented on the number of main and secondary exchanges and on the number of local, domestic long-distance and international long-distance conversations. Romania, with an increase of 21.5 percent in the number of telephones since 1974, showed the highest growth rate, but this country is still the lowest in number of telephones per 100 residents (5.10). Figures 2; tables 1; references 7: 5 German, 1 CEMA, and 1 Western.

1/1

EAST GERMANY

SCHIEDEWITZ, WALTER, graduate physicist

CHARACTERISTICS OF MODERN DATA PROCESSING SYSTEMS. PART 1: THIRD-GENERATION ELECTRONIC DATA PROCESSING SYSTEMS

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 17, Sep 76
pp 558, 567-569

[Abstract] This first part of a series of articles discusses various properties of 3rd-generation data-processing systems, with special emphasis on properties which permit the use of the system for specific applications. The following aspects are covered: multi-programmed processing of data, teleprocessing of data, real-time processing, dialog-type processing, multicomputer systems, and computer networks. While the 3rd-generation systems are much more capable than 2d-generation systems, it is evident that the capabilities of the 3rd-generation systems have characteristics which may be further developed into 4th-generation systems with capabilities which can presently only be guessed. Figures 6; table 1; no references.

1/1

EAST GERMANY

SCHIEDEWITZ, WALTER, graduate physicist

CHARACTERISTICS OF MODERN DATA PROCESSING SYSTEMS. PART 2 (CONCLUDING PART): DEVELOPMENT TRENDS FOR THE FUTURE

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 18, Sep 76
pp 592, 601-603

[Abstract] The changes between 2d- and 3rd-generation electronic data processing systems, and the characteristic performance and design properties of the 3rd-generation systems indicate the development that is likely to take place in the 4th-generation systems. This article discusses the structure of the typical data-processing system, the operational control, the memory hierarchy, the processors, the addressing, the program control, the formats of data and instructions, and the expected improvements. Among the latter are smaller size, increased switching speed, increased integration degree, increased reliability, reduced costs, higher memory capacity, shorter access times, higher data transmission rates, and lower prices per memory bit. Figures 2; tables 3; references 14: 3 Western and 11 German.

1/1

EAST GERMANY

STUERZ, H., East Berlin

STATUS AND DEVELOPMENT TRENDS OF TELEPHONE EXCHANGE TECHNOLOGY

East Berlin FERNMELDETECHNIK in German Vol 16 No 5, 76 pp 167-172

[Abstract] The subject matter (presented as a lecture in October 1975 at Ilmenau Technical University) considers the following aspects: structure and performance of the telephone network, development of traffic needs, performance of the supplier industry including the component industry, service quality of the Postal Service, and economic factors. The telephone statistics are evaluated, and the status of the exchange-technological system generation is discussed. Among the selected problems of computer-controlled system generation, the author discusses the connection field, the control system, and certain third-generation telephone exchange systems. In the DDR, the tasks ahead include remote control of small exchanges, use of more modern process computers, and sort out the overlap of digital and analog channels. Figures 7; tables 6; no references.

1/1

USSR

YELEKOYEVA, E. K. and GRANAT, S. M., Leningrad Branch of the Scientific Research Institute of Communications

A CIRCUIT CORRECTION FOR THE ATSK-100/2000 CODE TRANSCEIVER

Moscow VESTNIK SVYAZI in Russian No 8, Aug 76 pp 23-24

[Abstract] Instructions for modifying the ATSK-100/2000 code transceiver to correct operation of the hold markers for incoming calls. In the original circuit design, certain combinations of factors cause false operation of the markers so that two code transceivers of registers in the transmitting mode are connected through one another, exchange information, and one or both connections are broken. Diagrams are given showing connections to be unsoldered and jumpers to be inserted. In addition, transistors, diodes, resistors, capacitors and relays are changed and the time parameters of certain relays are altered. Figures 3.

1/1

USSR UDC 535-3:621.391.63

KOLOSOV, M. A., POZHIDAYEV, V. N. and FEDOROVA, L. V.

PROPAGATION OF ULTRAVIOLET RADIATION IN THE EARTH'S ATMOSPHERE AND THE POSSIBILITIES FOR DEVELOPING OPTICAL COMMUNICATION LINES IN THE UV BAND

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1595-1601 manuscript received 15 Jul 75

[Abstract] An evaluation is made of the maximum feasible length of communication lines in the ultraviolet region of the spectrum with consideration of the latest advances in laser technology, the latest data on attenuation of UV emission in the atmosphere and calculations of the background of solar radiation at the earth's surface. Basic parameters of ultraviolet lasers and photocathodes are presented. It is shown that UV communication lines extending several km are feasible. Such lines operating at wavelengths of 2500-2900 Å are independent of receiver orientation relative to the sun or time of day since there is no background emission in this band. In contrast, a system operating on 3370 Å has a reduction in effective range by a factor of 8-10 during daylight hours as compared with dark hours. The parameters of the receiver and signal-to-noise ratio have some effect on range, but the attenuation factor has the greatest influence. Figures 3; tables 3; references 13: 5 Russian, 8 Western.

1/1

USSR UDC 62.52:621.397.621

LITVAK, IGOR' IOSIFOVICH, LOMOV, BORIS FEDOROVICH, and SOLOVEYCHIK, IL'YA YEVSEYEVICH

PRINCIPLES OF THE CONSTRUCTION OF DISPLAY EQUIPMENT IN AUTOMATED SYSTEMS

Moscow OSNOVY POSTROYENIYA APPARATURY OTOBRAZHENIYA V AVTOMATIZIROVANNYKH SISTEMAKH in Russian "Sovetskoye Radio" 1975 352 pp

[Excerpt] Annotation

The book deals with the principal trends of the development of contemporary systems of information display (SID). Results of the latest research in engineering psychology are set forth, which must be taken into account during selection of the operating regimes and the SIR parameters. Features of the construction of representation facilities for individual use as well as for collective use, and versions of the technical realization of these facilities, are evaluated, including three-dimensional representation devices, as well as systems of information representation based upon the use of new physical principles.

The book is intended for engineers and scientific personnel working on the creation of automated management systems, for specialists in engineering

1/3

psychology, for students in higher technical educational institutions and universities while studying the courses "Radio-Engineering Systems," "Automated Management Systems," "Indicator Engineering," etc. The book may also afford interest for a wide circle of readers familiar with the principles of electronics, computer engineering, and television engineering.

Tables 45; figures 279; references 367.

CHAPTER HEADINGS PAGE

Introduction. Information display in contemporary automated management systems 5
Part I. Engineering-Psychology Planning of Display Equipment 13
Chapter 1.1. The visual analyzer 15
Chapter 1.2. Basic characteristics of visual perception 31
Chapter 1.3. Coding of information transmitted to a person for visual perception 63

2/3

USSR

LITVAK, IGOR' IOSIFOVICH, LOMOV, BORIS FEDOROVICH, and SOLOVEYCHIK, IL'YA YEVSEYEVICH, OSNOVY POSTROYENIYA APPARATURY OTOBRAZHENIYA V AVTOMATIZIROVANNYKH SISTEMAKH, "Sovetskoye Radio," 1975 352 pp

Part II.	Technical Facilities for Constructing Display Equipment	121
Chapter II.1.	Display equipment for individual use	123
Chapter II.2.	Display equipment for collective use	180
Chapter II.3.	Systems for representing three-dimensional space	301

3/3

USSR UDC 621.3.019.3.001.2

LEVIN, A. A., candidate of technical sciences and PERELEKHOV, YU. A., engineer

DETERMINATION OF LOSSES DUE TO FAILURES IN TELEMECHANICS APPARATUS BY ALLOWING FOR THE CHARACTERISTICS OF TECHNICAL SERVICING

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian No 7, 1976 pp 10-11

[Abstract] The authors of this article give a model of reliability of the telemechanic apparatus to be serviced. They provide a graph and a determination of the probability of the states of the model. They give an expression for determining the mean losses from nonreliability of the apparatus by allowing for the real characteristics of the technical servicing system, thus allowing an evaluation to be made of the effectiveness of the device's functioning. They give an example of their computation. Figure 1; references 5: 5 Russian.

1/1

USSR UDC 621.39:621.376.56

LEVIN, LEONID SEMENOVICH and PLOTKIN, MIKHAIL ABRAMOVICH

PRINCIPLES OF THE CONSTRUCTION OF DIGITAL TRANSMISSION SYSTEMS

Moscow OSNOVY POSTROYENIYA TSIFROVYKH SISTEM PEREDACHI in Russian "Svyaz'" 1975 176 pp

[Excerpt] Annotation

Consideration is given to principles of the digital transmission of various forms of signals in a communications network. An analysis of digital modulation methods is conducted, features of the construction and interaction of higher-order digital systems are investigated. The quality of information transmission in digital communications systems is evaluated.

The book is designated for engineers specializing in the field of the development and operation of digital transmission systems.

CONTENTS PAGE

Introduction 3

1/3

USSR

LEVIN, LEONID SEMENOVICH and PLOTKIN, MIKHAIL ABRAMOVICH, OSNOVY POSTROYENIYA TSIFROVYKH SISTEM PEREDACHI "Svyaz'" 1975 176 pp

Chapter 1. Digital transmission systems in a communications network
1.1. The channel-forming equipment of digital transmission systems 7
1.2. Digital linear routes 16
1.3. Hierarchy of digital transmission systems 27
1.4. Commutation equipment 30

Chapter 2. Digital modulation methods
2.1. Pulse-code modulation 40
2.2. Differential methods of digital modulation 65

Chapter 3. Unification and separation of digital flows
3.1. Basic definitions 77
3.2. Asynchronous compuling of high-speed digital flows 80
3.3. Synchronous coupling of high-speed digital flows 106
3.4. The transmission of low-speed discrete signals 109

Chapter 4. Cyclical synchronization of digital transmission systems
4.1. Structural scheme of a cyclical synchronization system 116

2/3

USSR

LEVIN, LEONID SEMENOVICH and PLOTKIN, MIKHAIL ABRAMOVICH, OSNOVY POSTROYENIYA TSIFROVYKH SISTEM PEREDACHI "Svyaz'" 1975 176 pp

4.2. Features of the cyclical synchronization of digital transmission systems 120
4.3. Selection of synchrosignal transmission structure 124
4.4. Selection of accumulation coefficients 128

Chapter 5. Quality of signal transmission along digital communications systems
5.1. Signal distortions in digital transmission systems 132
5.2. Parameters of digital telephone-signal transmission during time separation of the channels 138
5.3. Parameters of the digital transmission of group telephone signals 144
5.4. Parameters of the digital transmission of television signals 155

Bibliography 166

3/3

USSR UDC 621.315

FEDOSEYEVA, YE. G., SKOROSPELOVA, YE. V., FINKEL', E. E. and BRAGINSKIY, R. P.

RECOVERY OF PROTECTIVE COATINGS OF COMMUNICATION CABLES WITH THE AID OF HEAT-SEATING PIPES

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76 pp 47-49 manuscript received 22 Jul 74

[Abstract] The authors of this article cite the results of investigations on protective coatings of communication cables in metal shells with a polyethylene hose at the sites of their joining. Recovery of the protective coating is accomplished with the aid of heat-seating pipes of radiation-modified polyethylene. Laboratory tests have demonstrated that this method is reliable, promising, and economical. Economy is achieved by reducing the cost of materials used and reducing the time consumed in assembly work. Figures 2; reference 1: 1 Russian.

1/1

USSR UDC 621.315.758.37

RAZUMOV, L. D.

COMPUTING THE COEFFICIENTS OF PROTECTIVE EFFECT OF CABLE SHELLS UNDER THE INFLUENCE OF HIGH-VOLTAGE LINES

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76 pp 38-44 manuscript received 10 Sep 74

[Abstract] The author examines the protective effect of metal coatings of communication cables in the vicinity of high-voltage lines. He recommends a method of computing the real coefficients of protective effect of cables in a plastic outer hose and gives the results of the computations. He also discusses the conditions of grounding involved. Figures 8; table 1; references 4: 4 Russian.

1/1

USSR UDC 621.391

KHVOROSTENKO, N. P.

EVALUATION OF THE QUALITY OF RADIO COMMUNICATION ALONG CHANNELS WITH VARIABLE PARAMETERS

Moscow RADIOTEKHNIKA in Russian, No 8, 1976 pp 18-21 manuscript received after completion, 22 Sep 75

[Abstract] The author of this article seeks to evaluate in order of discussion the quality of radio communication with an average duration of error-free intervals L_n which limit the assigned value of n from below. Channels with variable parameters such as short-wave radio channels and channels with tropospheric scattering have such a broad range of random changes in their properties that one usually evaluates their suitability to transmission of information by the reliability of the communication rather than by the average quality of the radio communication. References 5: 5 Russian.

1/1

USSR UDC 621.391:534.232

SINITSA, V. N., SPIRIN, V. A. and CHIRKIN, N. M.

MULTITAP ACOUSTIC DELAY SYSTEM AS A CODING AND DECODING DEVICE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 82-83 manuscript received 19 Apr 75

[Abstract] The article describes a multitap delay line that shapes a radio signal in the form of a sequence of pulses for which the initial phase of the duty cycle frequency corresponds to the law 0, 0, 0, 0, 0, π, π, 0, 0, π, 0, π, 0 (13-digit Barker code). The delay line is made up of interdigital transducers of aluminum film on a lithium niobate backing. When a pulse of the proper duration is applied to the shaping transducer, phase-keyed signals with mutually inverted time structure are recovered from the remaining two transducers, the amplitude pulsations of the signal corresponding to the discrete structure of the shaping electrode. When a phase-keyed signal is applied to one of the outer electrodes, the decoded signal can be recovered from the shaping transducer. Figures 2; references 2: 1 Russian, 1 Western.

1/1

USSR UDC 621.391.2

POSTYUSHKOV, V. P.

OPTIMUM DISTRIBUTION OF ENERGY RESOURCE IN A MULTICHANNEL RADIO LINE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 87-90 manuscript received 21 May 75

[Abstract] The author considers the problem of effectiveness of a radio line consisting of N frequency-diversity channels when binary messages are transmitted to the address of a single recipient. A solution is found for the problem of minimizing the number of erroneously received symbols. The optimum power distribution is calculated for a six-channel line, and it is shown that a considerable gain can be realized by a change from uniform to optimum power distribution. Figures 3; references 3 Russian.

1/1

USSR UDC 621.391.81

LUSKINOVICH, P. N. and SKOMOROVSKIY, YU. A.

ON THE POSSIBLE ERRORS IN DETERMINING THE PARAMETERS OF A SIGNAL AT THE OUTPUT OF A LIGHT CONDUCTOR

Moscow RADIOTEKHNIKA in Russian No 8, 1976 pp 86-87 manuscript received after completion 15 Sep 75

[Abstract] The authors demonstrate that by analyzing the shape of an optical signal propagating in a real light-conductor optical communication line, the use of the characteristics of the linear circuits may lead to errors because the circuit modulator -- light conductor -- photodetector is an inertial nonlinear circuit. References 6: 6 Western.

1/1

USSR UDC 621.391.83:681.84.083.8

GITLITS, M. V., SKALIN, YU. V. and VODNEV, V. A.

COMBINATION NOISES AND DISTORTIONS IN DEVICES OF FM RECORDING

Moscow RADIOTEKHNIKA in Russian, No 8, 1976 pp 66-73 manuscript received 1 Oct 74

[Abstract] The authors examine questions involved in the formation of combination noises and distortions in magnetic FM recording apparatus with a low ratio of carrier frequency to upper modulating frequency of the information signal. The expressions obtained by the authors can be used also for selecting the optimal parameters of an FM recording system in accordance with the requirements imposed on it. Figures 10; references 8: 8 Russian.

1/1

USSR UDC 621.391.175

ARTEM'YEVA, S. YA., MAMATOV, A. I. and STRAKHOV, A. D.

TIME DISTRIBUTION FUNCTIONS FOR THE RECOVERY OF RADIO RELAY LINES

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76, pp 35-37 manuscript received 25 Jul 75

[Abstract] The authors cite statistical data collected on existing radio relay lines. They give the numerical values of the recovery parameters of radio relay line equipment. They conclude that the recovery functions of real lines are truncated as a consequence of the limitations of the interval in which the possible values of the recovery time are included. The parameters of these functions permit judging as to the duration and complexity of recovery. Because of the difficulties involved in the computations on the reliability of the radio relay line equipment, associated with the use of the truncated form of the law of Weibull-Gnedenko, it is feasible to convert to the exponential form of the distribution function. Table 1; reference 1: 1 Russian.

1/1

USSR UDC 621.391.828

APOROVICH, A. F.

ON THE THEORY OF ELECTROMAGNETIC COMMENSURABILITY

Moscow RADIOTEKHNIKA in Russian, No 8, 1976 pp 3-9 manuscript received 1 Sep 75

[Abstract] The author of this article briefly examines the problem and gives statements on the construction of a version of the general theory of electromagnetic commensurability, which consists of analyzing the interaction of radio engineering systems in the process of operation and synthesizing radio engineering systems by allowing for the requirements imposed for electromagnetic commensurability. This article was written for the purpose of reminding the reader of the extremely acute problems involved in contemporary radio engineering. References 10: 10 Russian.

1/1

USSR UDC 621.391.837

ORLOVSKIY, YE. L. and YEFIMOV, A. S.

REPRODUCTION OF HALF-TONE GRADATIONS IN PHOTOTELEVISION AND PHOTO-TELEGRAPHY APPARATUS

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76 pp 7-13 manuscript received 14 Nov 74

[Abstract] The authors of this article examine the conditions of reproduction of half-tone gradations in phototelegraphy and phototelevision apparatus under the effect of noise. On the basis of the equation for the visual threshold of sensing distinctions in brightnesses of the noisy image they obtain the optimal characteristics for analyzing and synthesizing the half-tones. They find that it is possible to control the contrast sensitivity of systems of electrical transmission of images by using nonlinear transformations on the transmitting and receiving sides of the image transmission system. Figures 6; references 8: 8 Russian.

1/1

USSR UDC 621.396:621.371

BARANOVSKIY, G. A., NEMIROVSKIY, A. S., TROITSKIY, V. N. and TSEMEKHMAN, V. M.

TELEVISION LINE WITH UTILIZATION OF DIFFRACTION SCATTERING ON THE CREST OF A MOUNTAIN BARRIER

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76, pp 29-31 manuscript received 4 Dec 75

[Abstract] The authors describe a television line of communication operating on centimeter waves in mountains, on which the signal is caused by diffraction scattering of the waves at the peak of the mountain with an irregular crest. They cite data on the statistical characteristics of the field and its nature and give qualitative indicators of transmission along the line. They observed insignificant distortions caused by the multi-ray nature of the approaching signal. However this distortion is small and requires no installation of a special apparatus for automatic correction. Figures 6; reference 1: 1 Russian.

1/1

POLAND UDC 621.392

KLEJMAN, HERMAN [Affiliation not given]

OPTICAL TELECOMMUNICATION LINES

Warsaw PRZEGLAD TELEKOMUNIKACYJNY in Polish Vol 49, No 6, 1975 pp 173-176

[Abstract] The author deals with the renewal of interest of scientists in optical telecommunication that is being made possible due to the discovery of the laser (1960). He examines the problem from a quadruple viewpoint--optical beams in space, optical beams in the atmosphere, optical beams in water, and lightguides--and reviews the achievements to-date in this domain. 3 figures; 8 references, including 4 Polish, 2 Russian and 2 English (of which one is in Russian translation).

1/1

USSR UDC 621.396.6.019.3

LEYBMAN, YU. A. and LEVCHENKO, A. F.

EVALUATING THE UTILIZATION FACTOR OF A DATA TRANSMISSION CIRCUIT BY ALLOWING FOR THE CHARACTERISTICS OF THE MONITORING SYSTEM

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76, pp 21-24 manuscript received 18 Apr 74

[Abstract] Continuous functional monitoring of the efficiency of the circuit as a whole and its individual elements (communication channels and data transmission apparatus) is necessary to ensure the given indicators of reliability of the data transmission circuit. Such control can be accomplished both with the aid of structurally autonomous monitoring devices and with the aid of built-in monitors. Real systems of monitoring the state of a data transmission circuit may produce a signal concerning the presence of failure in the circuit when in fact there is none, or they may erroneously indicate that the circuit is functioning

1/2

when in fact it has failed. Consequently, the readiness of the circuit to transmit data is practically less than that which an ideal system of monitoring would ensure. Along with allowing for the parameters of reliability of the communication channels and the data transmission apparatus, the monitoring system characteristics must be taken into account to evaluate the indicators of reliability of the data transmission circuit. Figures 2; References 3: 3 Russian.

2/2

USSR UDC 621.396.43

BULANDA, G. I., GOLOVIN, E. S. and LITVINOV, B. I.

A SYSTEM FOR SYNCHRONIZATION OF SINGLE-BAND EQUIPMENT FOR PERIPHERAL RADIO SERVICE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 123-124 manuscript received 31 Mar 75; after revision, 30 Oct 75

[Abstract] The typical peripheral radio service system has several subscriber stations and a single line station, preventing transmission of group synchronizing signals in the reverse direction (from the subscriber station to the line station). A synchronizing system is described in which pilot signals are transmitted only in the forward direction (from the line station to subscriber stations). The proposed technique for synchronization was checked out on single-band equipment for the decimeter wavelength region with three group stages of SSB signal conversion. Asynchronism was evaluated by frequency measurement of a test signal at the input of the line station transmitter and at the output of the line station receiver after passing in both directions through the system. With master oscillator instability of 10^{-4}-10^{-5} the signal is recovered with frequency error of less than 1 Hz, due only to residual mismatch between the synchronizing oscillator and the subscriber equipment. Figures 1; references 2 Russian.
1/1

USSR UDC 621.396.61

KAGAN, D. B., KALININ, L. B., PAVLOV, B. A., SOKOLOV, E. P. and CHUYKO, S. I.

RADIO TRANSMISSION EQUIPMENT

Moscow ELEKTROSVYAZ' in Russian No 7, Jan 76 pp 64-71 manuscript received 17 Feb 76

[Abstract] The authors describe several pieces of radio broadcasting equipment. The first is the PSV-5 transmitter manufactured in the USSR designed for high-quality radio broadcasting in the middle wave range; another is the PKM-1 transmitter operating in the range of 1.5-30 MHz. Another transmitter is one manufactured in the GDR, KNI-E has an output power of 1 kW. They also describe an automated television radio station -- the ATRS-5/1 -- with a power of 5/1 kW and designed for operation in the frequency range of 48.5-100 and 174-230 MHz. Another television transmitter -- the NTV10-1 -- is manufactured in Poland with a power of 10/1 kW. In the transmitter III TV-5 of the radio station Zona-II, manufactured in Czechoslovakia, modulation is accomplished on the carrier frequency by shift in the lamp penultimate cascade. Other non-Soviet block equipment is also described. Figures 12; table 1; references 2: 2 Russian.
1/1

HUNGARY UDC 621.396.74.029.6:654.195.6.021:65.011.44

CSERNY, LASZLO, Dr, Plant Economy and Organization Department, YMEMF

FACTORS CHARACTERIZING THE EFFECTIVENESS OF BROADCASTING SYSTEMS IN THE VHF [VERY HIGH FREQUENCY] AND THE UHF [ULTRA HIGH FREQUENCY] BANDS

Budapest HIRADASTECHNIKA in Hungarian Vol 27 No 9, Sep 76 pp 275-279 manuscript received 4 Aug 75

[Abstract] Studies were made to establish values for the proper characterization of the effectiveness of VHF and UHF broadcasting systems. The mathematical background for the studies was that described by the author in this journal (Vol 26, 1975, No 8, pp 233-239). The studies indicated that the effectiveness can be characterized best by considering not only the area covered but also the number of residents in the area covered and the service level (meaning the relationship between population density and residential distance from the distance from the transmitter). A combined index was developed; it characterizes both the service area and the quality of the service. Figures 5; references 8: 2 Hungarian, 1 German, 1 Indian, and 4 Western.

1/1

USSR UDC 621.396.96

OBOLENSKAYA, G. A. and KATIN, S. V.

CHARACTERISTICS OF A SYSTEM OF BINARY DETECTION WITH SEQUENTIAL ANALYSIS

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 38-42 manuscript received 17 Mar 75; after revision, 23 Jun 75

[Abstract] The methods of queueing theory are used to find the characteristics of detection of binary quantized radio signals in systems with sequential analysis. The signal and interference from the detector stage of the receiver are sent to a quantization threshold device with outputs connected to the inputs of two AND gates. The other inputs of the AND gates are connected respectively to a signal strobe and a control strobe generator, and the outputs are connected to the inputs of gating circuits that eliminate pairwise coincidences. The gated pulses are sent to a cumulative reversible counter with output connected to a decision-making threshold device. A simple engineering expression is derived for the probability that the counter will accumulate the decision-making threshold number of pulses by a given time. An example is given showing calculation of the probabilities of false alarms and true detection. Figures 5; references 2 Russian.

1/1

USSR UDC 621.397.331.1

OVCHINNIKOV, YU. N. and ROZHKOV, V. M., Novosibirsk Electrical Engineering Institute of Communications

A CONTROLLABLE MECHANICAL MODULATOR

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 8, 1976 pp 103-106 manuscript received 25 Dec 75

[Russian abstract provided by the source]

[Text] A mechanical modulator of optical emission is proposed that provides independent regulation of the duration and recurrence rate of optical pulses for durations of 1 ms or more and rates of 20 Hz or less. Relations are found for calculating the shape of the output signal. Figures 1; references 3 Russian.

USSR UDC 656.254.141.004.67

BORTSOV, DMITRIY VASIL'YEVICH

MAINTENANCE AND REPAIR OF TELEGRAPH APPARATUS ON RAILROAD LINES

Moscow TEKHNICHESKOYE SODERZHANIYE I REMONT TELEGRAFNOY APPARATURY NA ZHELEZNODOROZHNOM TRANSPORTE in Russian, "Transport," 1975 216 pp

[Extract] This book presents problems of the organization of the operation and repair of the ST-2FM, STA-M67, T-63 telegraph apparatus and T-53 transmitter based on the use of norms of time for maintenance and repair of telegraph communications devices over signaling distances and railroad communications approved by the railroad ministry, taking account of the most advanced methods for this work. Principles of operation and areas of application of telegraph transfer devices types UVP-2, UPDTA, T-68 and others are presented. A brief description and practical recommendations for use are presented for the IKI-St, EDIT-1, RETS-1, VO-1, ETI-64, SCHRU-2 and other measurement instruments, increasing the quality of maintenance of communications devices and the reliability of their operation. The book is designed as an aid for engineering and technical telegraph personnel and can be used as a practical guide for telegraph electrical and mechanical technicians to increase their production qualifications.
1/1

USSR UDC 537.533.31

ZINCHENKO, B.N., ZINCHENKO, N.S., and KHIZHNYAK, N.A.

NEW PHENOMENA IN UNSTABLE ELECTRON BEAMS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 2018-2021 manuscript received 11 Aug 75

[Abstracts] Some results are presented of investigations of high-perveance beams with Brillouin focusing. The investigations were performed with the aid of a high-verveance electron-optical system, consisting of a 3-electrode gun with longitudinal compression of the charge and focusing by a paraboloid magnetic lens. A continuous cylindrical beam of electrons was formed in the system and a quasi-Brillouin focusing took place outside the gun. At a beam length ($L \simeq 10$ mm) the magnetic field increased slightly. Figures 4; references 10: 6 Russian; 4 Western.

1/1

USSR UDC 621.832

SEKERESH, B. I., Hungarian Peoples Republic

DEVELOPMENT OF RAPID-INCANDESCENT CRT OF LOW POWER FOR INSTRUMENTS BASED ON TRANSISTORS

Moscow RADIOTEKHNIKA in Russian, No 8, 1976 pp 74-77

[Abstract] The author gives theoretical statements associated with construction and makes a detailed mathematical analysis of the thermal regime of the cathode. He demonstrates that the optimal conditions of a small heating time and thermal stability of the cathode correspond to an approximation equation of losses to heat emission and heat yield of the cathode. Figures 6; table 1; references 6: 1 Hungarian, 5 Western.

1/1

USSR UDC 621.37.004.14:634.043

BORODIN, L.F., KIRDYASHEV, K.P., STAKANKIN, YU.P., and CHUKHLANTSEV, A.A.

APPLICATION OF MICROWAVE RADIOMETRY IN INVESTIGATION OF FOREST FIRES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1945-1950 manuscript received 16 Jul 75

[Abstraction] An evaluation is made of the intensity of electromagnetic radiation in the microwave band of the flame of a forest fire. The effect is considered of a smoke trail and the crown of trees on the spectrum of microwave radiation,and the possibility of detecting the locations of forest fires. Conclusions are drawn from an analysis of the experimental data and a comparison of them with the results of calculations, and with the data from aerial photography in the 0.8 and 3.4 cm wave band. Curves are shown of the following: 1)Spectral dependences of microwave radiation of the flame of a forest fire; 2) Spectral dependences of flame of forest fire with presence of smoke layer; 3)Spectral dependence of absorption of radiation in crown of trees; and 4)Spectral characteristic of radiation of model of lower fires. Figures 6; references 6: 5 Russian; 1 Western.
1/1

USSR UDC 621.371.3

ZHELTONOG, K. S. and KOPILOVICH, L. YE.

ON THE FEASIBILITY OF RADIOMETRIC DETERMINATION OF THE ALTITUDE DEPENDENCE OF THE COEFFICIENT OF ABSORPTION OF THE ATMOSPHERE ON A WAVELENGTH OF 2.53 mm

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76
pp 1740-1742 manuscript received 4 May 75

[Abstract] A theoretical study is done on the feasibility of obtaining information on the altitude profile of the absorption coefficient $\gamma(h)$ in the atmosphere on a wavelength of 2.53 mm by measuring the difference between the zenith brightness temperature and the kinetic temperature of the atmosphere at different altitudes. The mathematical model is based on the assumption that the zenith brightness temperature is measured by a radiometer on 2.53 mm with vertical motion in a laminar atmosphere with standard distributions of temperature and humidity. Curves are plotted for the altitude behavior of temperature difference for various models of $\gamma(h)$. It is shown that variations of the order of 10% in $\gamma(h)$ will be reflected on the altitude behavior of temperature difference if measurements are accurate to 1 kelvin. Estimates show that the error due to reduction of line width with altitude does not exceed 0.1 K from ground level to 20 km for a passband of 100 MHz. Figures 2; references 11: 9 Russian, 2 Western.
1/1

USSR UDC 621.371.33

ANDRIANOV, V.A., ARMAN, N.A., KOBARDINA, I.N.

SCATTERING OF RADIO WAVES BY AN UNDERLYING SURFACE WITH VEGETATIVE COVER

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian, Vol 21, No 9, 1976, pp 1816-1821 manuscript received 7 Jul 75

[Abstract] The results are presented of experimental measurements of the density spectra of the scattering of centimeter radio waves from three forest sections of birch, alder, and pine with a change of the wind speed in the 0.8--7 m/sec range. It is shown that the forms of the spectra of the signal scattered by the forst sections with birch, alder, and pine correspond qualitatively with one another. The width of the spectra depends on the wind speed and the type of vegetation, during which an increase of the mobility of the scatterers leads to a broadening of the spectrum. With small frequency differences from the carriers the spectrum is described by an exponential function and with large frequency differences by a power function. In the case of scattering of radio waves by vegetation with an increase of the wind speed, a redistribution of the energy of the energy of the scattered signal from the low-frequency part to the high-frequency takes place. Figures 4; references 7 Russian.
1/1

USSR UDC 621.371.167

RYBAKOV, V. S.

STATISTICAL CHARACTERISTICS OF THE PHASE DIFFERENCE OF SIGNALS WHEN CENTIMETER WAVES PROPAGATE BEYOND THE RADIO HORIZON

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 111-114 manuscript received 13 Dec 74; after revision 26 Nov 75

[Abstract] The article gives the results of calculation of phase-difference characteristics using the space-time properties of a statistical gaussian model of the field of ultrashort radio waves as determined from the results of amplitude measurements. The calculations are done in the 10-cm wave band for transmission paths from 21 to 103 km long. It is shown that for the case of reception of centimeter waves beyond the radio horizon, at least in the diffraction zone, rather than systematizing the statistical characteristics of the phase difference, one may systematize the parameters of the gaussian model that permit reliable calculation of these characteristics. Figures 4; tables 1; references 5 Russian.

1/1

USSR UDC 621.371.332.3

TOVARA, K. K.

REFLECTION OF PULSED ELECTROMAGNETIC WAVES FROM HETEROGENEOUS LAYERS

Moscow RADIOTEKHNIKA in Russian, No 8, 1976 pp 41-48 manuscript received 20 May 75

[Abstract] The author investigates the reflection of pulsed electromagnetic waves from layers with one and two variable parameters -- dielectric constant and specific conductivity. The parameters of the layers are determined by the method of synthesis. The basic relationships are derived for the electromagnetic pulse propagating in a heterogeneous layer and the details of the parameters are described. The author also gives equations for synthesizing the electrodynamic parameters. Figures 3; references 2: 2 Russian.

1/1

USSR UDC 621.371.333:523.42

KOLOSOV, M. A., YAKOVLEV, O. I., TRUSOV, B. P., MOLOTOV, YE. P., ANTSIBOR, N. M., YEFIMOV, A. I., ROZMANOV, V. M., TIMOFEYEVA, T. S., CHUB, YE. V., SHTRYKOV, V. K., and YAKOVLEVA, G. D.

RADIO PENETRATION OF THE ATMOSPHERE OF VENUS BY THE 'VENERA-9' AND 'VENERA-10' PROBES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1585-1594 manuscript received 16 Mar 76

[Abstract] Until recently the only radio studies of the atmosphere of Venus were those of the Mariner fly-by data. This article gives new experimental data provided by analysis of information from the Venera-9 and Venera-10 satellites transmitted over the period from 26 October to 7 December 1975. Altitude profiles are plotted from observations of radio wave propagation through the atmosphere of Venus for the coefficient of refraction, density, pressure, temperature and electron concentration in the troposphere and ionosphere. It is found that radio observations at altitudes of 35-350 km provide reliable information on the atmosphere of Venus. A comparison with similar studies of the Martian atmosphere shows that radio observations are more effective for Venus due to greater density and electron

1/2

KOLOSOV, M. A., YAKOVLEV, O. I. et al., RADIOTEKHNIKA I ELEKTRONIKA, Vol 21, No 8, Aug 76 pp 1585-1594

concentration. The most difficult zone for research is the region between 36 and 45 km above the surface of the planet, which is close to the level of critical refraction. A comparison with the results of direct measurements by Soviet landers showed satisfactory agreement at pressures of 0.2-2 atmospheres. The method of radio penetration is particularly sensitive to laminar formations in the upper cloud levels. Detailed data on parameters of the atmosphere for four regions of the planet are to be published in the journal "Kosmicheskiye issledovaniya" [Space Research]. The authors thank A. G. Pavel'yev, and L. G. Volkov for assistance in fulfilling this work. Figures 8; references 6: 3 Russian, 3 Western.

USSR

PHOTO DETECTORS ON A BASIS OF THE EFFECT OF PHOTON DRAG OF ELECTRONS (FP AND FPU)

Moscow KVANTOVAYA ELEKTRONIKA in Russian Vol 3, No 6, 1976 pp 1376-1366

[Text] The instruments are a new class of radiation detectors and are designed for measuring power and time characteristics of IR radiation from pulsed lasers. They do not require cooling and possess a high time resolution, broad dynamic range and elevated noise stability in operation. The FP photo detectors have no amplifiers and the FPU types have built-in wide-band amplifiers. The FPU-50 and FPU-100 instruments have a set of replaceable radiation detectors and cover a power range for CO_2 lasers from 10 to $2 \cdot 10^6$ W. An oscillograph or pulsed voltmeter may be used as the registering instrument. Supply of the FPU instruments is accomplished both from batteries built into the instruments and from a 220 V network. An outer view of all types of FP and FPU instruments, as well as the replaceable detectors is shown. The photo detectors were developed at the Physico-Technical Institute imeni A. F. Ioffe of the USSR Academy of Sciences Leningrad K-21, Politekhnicheskay Ul. 26. The developers were P. M. Valov, K. V. Goncharenko, Yu. V. Markov, V. V. Pershin, S. M. Ryvkin and I. D. Yaroshetskiy.

1/3

USSR

KVANTOVAYA ELEKTRONIKA, Vol 3, No 6, 1976 pp 1365-1366

Technical Characteristics

	Тип прибора 1.	Диаметр входного окна, см 2.	Фоточувствительность, мВ/кВт 3.		Временное разрешение, с 4.	Верхний предел измеряемой мощности, кВт 5.	Эквивалентная мощность шума, Вт 6.
			$R_н=\infty$	$R_н=50$ Ом			
7.	ФП-0,5	0,5	1,6	0,6	$\leqslant 1 \cdot 10^{-9}$	$4 \cdot 10^3$	15
	ФП-1	1	0,5	0,3	$\leqslant 1 \cdot 10^{-9}$	$1,6 \cdot 10^4$	30
	ФП-2	2	0,13	0,09	$\leqslant 1,5 \cdot 10^{-9}$	$6,4 \cdot 10^4$	50
	ФП-3	3	0,06	0,05	$\leqslant 2 \cdot 10^{-9}$	$1,4 \cdot 10^5$	100
	ФП-5	5	0,02	0,02	$\leqslant 3 \cdot 10^{-9}$	$4 \cdot 10^5$	250
8.	ФПУ-50	1	—	250	$\leqslant 6 \cdot 10^{-9}$	4,0	6
		1	—	140	$\leqslant 6 \cdot 10^{-9}$	7,0	11
		1	—	50	$\leqslant 6 \cdot 10^{-9}$	20	30
		1	—	10	$\leqslant 6 \cdot 10^{-9}$	10^2	150
		1	—	2,0	$\leqslant 6 \cdot 10^{-9}$	$5 \cdot 10^2$	750
		1	—	0,5	$\leqslant 6 \cdot 10^{-9}$	$2 \cdot 10^3$	$3 \cdot 10^3$
	ФПУ-100	1	—	250	$\leqslant 3 \cdot 10^{-9}$	4,0	8
		1	—	140	$\leqslant 3 \cdot 10^{-9}$	7,0	15
		1	—	50	$\leqslant 3 \cdot 10^{-9}$	20	50
		1	—	10	$\leqslant 3 \cdot 10^{-9}$	$1 \cdot 10^2$	200
		1	—	2,0	$\leqslant 3 \cdot 10^{-9}$	$5 \cdot 10^2$	$1,1 \cdot 10^3$
		1	—	0,5	$\leqslant 3 \cdot 10^{-9}$	$2 \cdot 10^3$	$4,5 \cdot 10^3$
	ФПУ-100Б	3	—	8,0	$\leqslant 3 \cdot 10^{-9}$	150	$2,5 \cdot 10^2$
	ФПУ-250	1	—	40	$\leqslant 1,5 \cdot 10^{-9}$	60	10^2
	ФПУ-50	1	—	13	$\leqslant 6 \cdot 10^{-10}$	120	$2,5 \cdot 10^2$

2/3

USSR

KVANTOVAYA ELEKTRONIKA, Vol 3, No 6, 1976 pp 1365-1366

Comment: R_H is the load resistance. The photosensitivity of the receivers is indicated for the 10.6-micrometer wavelength.

---

1. Type of instrument.
2. Diameter of input window, cm.
3. Photosensitivity, mV/kW.
4. Time resolution, seconds.
5. Upper limit of measurable power, kW.
6. Equivalent noise power, W.
7. FP
8. FPU

3/3

EAST GERMANY

HEINZ, MICHAEL, and OTTO, RAINER, graduate engineers

INSTRUMENT GROUP 19: THE AC-RMS DIGITAL VOLTMETERS G-1204.500 AND G-1204.010 FROM ERFURT RADIO WORKS STATE ENTERPRISE. PART 2

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 18, Sep 76 pp 599-600

[Abstract] This part of the series of articles discussed the users of these two voltmeters (identical except that the G-1204.500 is a tabletop instrument and the G-1204.010 is a panel instrument), which include scientific research institutions, instrument manufacturers, laboratories, and various industries. It also describes the accessories available, which include connection systems for multiple units. The instruments comply with the dimensions specified in East-German Standard TGL 25,064 and with the connections specified in TGL 200-3603. They contain printed circuits, transistors, and integrated circuits. Common-mode suppression is high because of the guarded construction. The method of measuring is based on the true effective values with the aid of a thermocross. Performance and operating specifications will be described in a subsequent part of this series. Figures 2; no references.
1/1

EAST GERMANY / SOVIET UNION

LUTCHKOV, V. S., RADTSHENKOV, V. F., and BIL'UK, G.YE., Moscow

POWER MEASUREMENT OF OSCILLATIONS IN THE VERY HIGH FREQUENCY SOURCES WITH THE AID OF FERRITE TRANSDUCERS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 7, 76 pp 253-254 manuscript received 5 May 75

[Abstract] This article is the text of the authors' lecture delivered at the 23 to 27 September 1975 IInd International Conference on Microwave Ferrites held in Suhl. Power measurement of oscillations in very-high frequency sources may be carried out with the aid of the cross multiplication effect of ferrites used in appropriate transducer systems. These systems permit the inertia-free conversion of the very-high frequency signals in signals of the same amplitude which are proportional to the very-high frequency power. The transducer, of which the design and operation was described and illustrated, also permits measurement of peak power in pulse-shaped and monochromiatic very-high frequency signals, and frequency measurement of pulse-shaped very-high frequency signals. Figures 2; references 3: All Russian.
1/1

EAST GERMANY

SCHILDER, D., Institute for Communications Engineering, Association of State Enterprises for Communications and Metrology, Radio and Communications Technology, Berlin

MEASUREMENT OF THE OHMIC RESISTANCE OF DIODE CHIPS IN THE MICROWAVE RANGE

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 2, 76 pp 64-65 manuscript received 28 Jan 75

[Abstract] The measurement system described involves the connection of a variable blind resistor in series with the chip and shifting the impedance point along the effective resistance circuit until the total resistance becomes real. The test system is designed so that the chip interrupts the internal conductor of a coaxial cable. The d.c. series resistance is fed to the chip through the internal conductor. The test system also contains a reactance line. The design and construction of the test system is illustrated, and the adaptation requirements and reactance-line losses are discussed. The measurement procedure is described and some results are presented. Figures 4; no references.
1/1

HUNGARY UDC: 53.084.2:62-525

HELM, Laszlo, Dr, candidate of technical sciences, MTA SZTAKI [Computer Technology and Automation Research Institute, Hungarian Academy of Sciences]

STATIC CHARACTERIZATION OF FLUIDIC REFLECTION SENSORS

Budapest MERES ES AUTOMATIKA in Hungarian Vol 24 No 5, 76 pp 153-157 manuscript received 8 Sep 75

[Abstract] This article reviews the performance parameters of various commercial fluidic reflection sensors (Types RFL-2, RFL-4, RFL-6, and RML-5 made by Festo; Type PRX-1 made by Howie; Type FAD-593 made by Corning; No. 6080067 made by Pitney Bowes, No. 300490 made by Fluidonics, and Type 4PS-910 made by Norgren). It also discusses a technique for measuring the characteristic static parameters which involves the plotting and analysis of the diagram indicating the relationships between the input and output signals. The diagram actually plots the p_k/p_t ratio as a function of x (p_k denotes the output pressure, p_t denotes the supply pressure, and x denotes the relative position of the sensed object from the sensor). The results characterize the performance of the sensor. Figures 6; tables 3; references 2: one Western and 1 German.
1/1

USSR UDC 62-27.002:621.317

TIMOFEYEVA, Z. A., doctor of technical sciences and ZHERMUNSKAYA, L. B., candidate of technical sciences

WIRES OF BERYLLIUM FOR HIGH-FREQUENCY ELECTRICAL MEASURING INSTRUMENTS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 pp 48-49

[Abstract] Products of beryllium have a number of valuable physico-mechanical properties and are being used with increasing frequency in the various branches of technology, including instrument construction. Recently in the USSR success has been achieved in developing a technology for the manufacture of 0.1 mm diameter wire and 0.1 mm thick foil; today research is being conducted on the industrial use of these products. The authors give the physico-mechanical properties of test samples of beryllium wires manufactured from the selected optimum modes. The use of beryllium wires is quite promising for increasing the frequency range of measurements and the quality of high-frequency loop and frame oscillographic galvanometers as well as other high-frequency measuring instruments where the examined characteristics are substantial. Figure 1; tables 2; references 3: 3 Russian.

1/1

USSR UDC 621.317:621.35

KONOVALOV, A. A., LEPORSKAYA, YE. A. and ULICHEV, V. V., Leningrad Institute of Aviation Instruments

A PROGRAMMABLE TIME RELAY BASED ON ELECTROCHEMICAL DISCRETE HYDROGEN INTEGRATORS

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 8, 1976 pp 44-47 manuscript received 17 Nov 75

[Abstract] The article describes a programmable timer with long delays that uses an electrochemical discrete hydrogen integrator as the master timing element. The integrator is a hermetically sealed glass vessel that is divided into two hydrogen-filled chambers by a porous glass disk impregnated with a sulfuric acid solution. Platinum electrodes that form the input circuit of the integrator are sealed into both sides of the disk. In the center of the disk is a capillary opening filled with electrolyte. In this opening is a fine platinum wire that forms an output circuit with one of the input electrodes. When an electric current flows through the input circuit, electrolytic action causes a pressure difference between the anode and cathode hydrogen chambers. When the pressure difference is sufficient to displace the electrolyte from the capillary, the electrodes of the output

USSR

KONOVALOV, A. A., LEPORSKAYA, YE. A. and ULICHEV, V. V., IZVESTIYA VUZov, RADIOELEKTRONIKA Vol 19, No 8, 1976 pp 44-47

circuit are separated and this condition is used for the output signal. Hydrogen flows through the capillary to equalize pressure in the two chambers, and the capillary is refilled with electrolyte through the action of surface tension. The range of time delays is $10-10^5$ s. Timer circuits are examined in which the commutating elements are electromagnetic relays, and also where a step-by-step switch is used as the commutator, decoder and counter. Figures 2; references 2 Russian.

2/2

USSR UDC 621.317.791

GENERAL-PURPOSE DIGITAL VOLTMETER SHCH68001

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 p 34

[Text] The voltmeter is designed in conjunction with inserted blocks for measuring ac and dc voltages as well as dc resistances. The ranges of the measured voltages: dc -- from 1 microvolt to 1000 V (with a range of 10, 100 mV, 1, 10, 100, 300 and 1000 V), ac -- from 100 microvolts to 1000 V (with a range of 1, 10, 100 and 1000 V). The range of measurable resistances is from 0.1 Ohm to 10 MOhm (with a range of 1, 10, 100 kOhm, 1, 10 MOhm). The basic error: in measuring a constant voltage no more than $\pm[0.05+0.02\ (U_F/U_x-1)]$, in measuring a variable voltage in the frequency range from 20 Hz to 100 kHz no more than $\pm[0.15+0.05\ (U_F/U_x-1)]$, in measuring resistance no more than $\pm[0.1+0.02\ (R_F/R_x-1)]\%$, (where U_F and R_F are the final values of the measurement ranges, U_x and R_x are the current values of the measured quantity). Attenuation of noise of normal type is no less than 66, of common type no less than 160 dB. Output into digital printing is in the code 8-4-2-1. Supply is from a 220 V ac, 50 Hz. Power required from the network is no more than 70 V·A. The dimensions are 480 X 120 X 420 mm; the mass is no more than 20 kg. It is made by the Nevinnomyssk Plant of Electrical Measuring Instruments.

1/1

USSR UDC 621. 17.799

DYATLOV, A. P. and ORLOV, G. N.

METHOD OF AUTOMATIC MONITORING AND CORRECTING THE PARAMETERS OF RECEIVERS

Moscow RADIOTEKHNIKA in Russian, No 8, 1976, pp 55-60 manuscript received 23 Oct 74; after completion, 29 Sep 75

[Abstract] The authors examine a method of continuous automatic monitoring and correction of the parameters of spectroanalyzers and radio receivers in the presence of input effects. They demonstrate the possibility of monitoring the noise factor, the amplitude-frequency and phase-frequency characteristics of the channels and determine the error in monitoring and correcting the parameters. Figure 1; references 6: 6 Russian.

1/1

USSR UDC 621.375

YEVLANOV, YU. N., MALINOVSKIY, V. N., FEDOTOV, V. P., candidates of technical sciences and SHATOKHIN, A. A., engineer

METHOD OF DETERMINING THE NOISE CHARACTERISTICS OF SMALL SIGNAL AMPLIFIERS

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 p 45

[Abstract] The authors are concerned with planning highly sensitive and precise electronic ways to make measurements; they find it is essential to have sufficiently complete and precise information about the noise characteristics of the elements to be used. Textbooks and technical specifications do not contain information about the low-frequency noise component (type 1/f noise) and do not give any data about the scatter of noise characteristics from sample to sample. Low-frequency noise is bound from above by the frequency f_0 and when f is greater than f_0, the thermal noises with a uniform spectrum predominate over type 1/f noises. Figure 1; references 2: 2 Russian.

1/1

USSR UDC 621.376.6

COMBINED DIGITAL VOLTMETER SHCH68002

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 p 34

[Text] The voltmeter is designed to operate in conjunction with inserted block-converters for measuring various physical quantities with output of the measurement result in digital form on a display panel and in parallel binary-digital code jointly to an external registering device. The Shch68002-01 instrument is designed for measuring direct and slowly alternating voltages. The range of measured voltages is from 1 microvolt to 1000 V (with a range of 100 mV, 1, 10, 100 and 1000 V). Selection of the range of measurement is manual, automatic and long-range. Measurement error does not exceed $\pm[0.02+0.05\ (A_F/A_x-1)]\%$ (where A_F is the final value of the measurement range, A_x is the current value of the measured quantity). The input resistance is 1000 (on ranges of 100 mV and 1 V) and 10 MΩhm (on the other ranges). Speed of response is 1-4 measurements per second. Suppression of noise of

1/2

USSR

PRIBORY I SISTEMY UPRAVLENIYA No 7, 1976 p 34

normal type is no less than 60, of common type no less than 120 dB. Output onto the digital printer is 8-4-2-1. Supply from the 220 V, 50 Hz ac network. Power required from the network is no more than 60 V·A. Operating conditions: temperature of ambient air 10-35°C, relative humidity up to 80%. Dimensions 480 X 118 X 420 mm; mass 15 kg. It is produced by the Nevinnomyssk Plant of Electrical Measuring Instruments.

2/2

USSR UDC 621.398:517.11

SHVINDIN, G. I. and OSTROVSKIY, A. YU., engineers, Aleksandriysk Electromechanical Plant

A DEVICE FOR DEBUGGING AND TESTING CONTROL BLOCKS ON LOGIC ELEMENTS

Moscow PROMYSHLENNAYA ENERGETIKA in Russian, No 8, Aug 76 pp 13-14

[Abstract] The authors of this article propose a test bench for debugging and checking circuits for automated devices and those used in telemechanics, constructed on Logic-T elements. They say that use of this test bench will permit a significant increase in productivity of the debugging operations and will reduce the amount of time involved in them. They state that implementation of this test bench for debugging control stations on logic elements will give an annual savings of 1700 rubles, whereas the bench itself costs only 120 rubles. Figure 1.

1/1

USSR UDC 621.791.382

ELECTRONIC DIGITAL AMPERE-VOLTMETER SHCH68003

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 p 34

[Text] The voltmeter is designed to measure resistances and direct and slowly alternating currents and voltages. The range of measurable voltages is from 1 microvolt to 1000 V (with a range of 10, 100 mV, 1, 10, 100 and 1000 V). The range of measurable currents is from 0.1 nA to 1 A (with a range of 1, 10, 100 microamps, 1, 10, 100 mA and 1 A). The range of measurable resistances is from 0.1 Ohm to 10 MOhm (with a range of 1, 10, 100 kOhm, 1 and 10 MOhm). The precision class is 0.05/0.02. The input resistance in the mode of measuring voltage is 1000 (with a range of 10 V) and 10 MOhm and more (for the remaining ranges). The maximum speed of response is 25 measurements per second. Suppression of noise of normal type is 60, of common type 130 dB. Output onto the digital printer is in code 8-4-2-1. Supply from a network of 220 V, 50 Hz ac. Required power is 45 V.A. It is made by the Nevinnomyssk Plant of Electrical Measuring Instruments.

1/1

USSR UDC 629.7.064+058.54+0.48.005(022)

BONDARCHUK, IVAN YEVSEYEVICH and KHARIN, VLADIMIR IVANOVICH

AVIATION AND RADIOELECTRONIC EQUIPMENT OF THE AN-24 AIRCRAFT

Moscow AVIATSIONNOYE I RADIOELEKTRONNOYE OBORUDOVANIYE SAMOLETA AN-24 in Russian "Transport" 1975, 280 pp. Figures 141; tables 6

[Excerpt] Annotation

In the book are set forth the arrangement, the principle of action, and the features of the flight operation of the electrical equipment: of the electric power sources, of the electrical engine-starting system, the systems of weathercocking the propellers, the fire-extinguishing system, the deicing and heating devices, the lighting equipment; the radio equipment; the radionavigation equipment, the radars; the instrumentation: the piloting-and-navigation and gyroscopic instruments and automatic pilots, the oxygen equipment.

The book is designated for the flight and technical personnel of civil-aviation operating enterprises. It may be used by auditors at schools of advanced flight training and UTO [expansion unobtainable] and by flight-school students.
1/3

USSR

BONDARCHUK, IVAN YEVSEYEVICH and KHARIN, VLADIMIR IVANOVICH, AVIATSIONNOYE I RADIOELEKTRONNOYE OBORUDOVANIYE SAMOLETA AN-24, "Transport" 1975 280 pp

CHAPTER HEADINGS		PAGE
Section I.	Electrical equipment	
Chapter 1.	Aircraft electrical system	3
Chapter 2.	Direct-current electric power sources	13
Chapter 3.	Alternating-current electric power sources	27
Chapter 4.	Electrical systems for control of the engine and the gas-turbine installation	39
Chapter 5.	The signalization and illumination systems	64
Chapter 6.	Electrical deicing and heating systems	82
Section II.	Radio equipment	
Chapter 7.	Radio-communications equipment	91
Chapter 8.	Radionavigation equipment	126
Chapter 9.	Radar stations RPSN-2 and RPSN-3	155
2/3

USSR

BONDARCHUK, IVAN YEVSEYEVICH and KHARIN, VLADIMIR IVANOVICH, AVIATSIONNOYE I RADIOELEKTRONNOYE OBORUDOVANIYE SAMOLETA AN-24, "Transport" 1975 280 pp

Section III. Instrument equipment

Chapter 10. Piloting and navigation instruments 186
Chapter 11. Instruments for monitoring the operation of the aircraft engines and auxiliary instruments 243

3/3

EAST GERMANY

KUEHN, H., graduate engineer, Carl Zeiss State Enterprise, Jena

STABILIZED HELIUM-NEON GAS LASER

East Berlin FEINGERAETETECHNIK in German Vol 25 No 6, Jun 76 pp 259-261

[Abstract] A stabilized helium-neon gas laser with electronic frequency stabilization was described and illustrated with photographs and performance diagrams. Stability is $\Delta\nu/\nu = 1 \cdot 10^{-7}$ in single-mode operation in the lamb-dip. The running-in performance of the laser is outstanding; it moves through 1 to 10 orders in approximately 30 minutes. Thereafter there is only a slight frequency drift, caused primarily by thermal compensation processes and fluctuations in atmospheric pressure. The control is based on the principle of laser wobbling. Frequency modulation is so low that the coherence length of the laser remains $\geq$ 40 m. The usefulness of this device for distance measuring is pointed out. The lamb-dip frequency of each individual laser made by Carl Zeiss is compared to that of a calibrated standard laser. Figures 9; reference: 1 German.

1/1

EAST GERMANY/CZECHOSLOVAKIA

PETRU, F., graduate engineer, candidate of sciences, Czechoslovak Academy of Sciences, Instrument Construction Institute, Brno, Czechoslovakia

PROPERTIES OF CZECHOSLOVAK-MADE SINGLE-FREQUENCY LASERS AND LASER INTERFEROMETERS

East Berlin FEINGERAETETECHNIK in German Vol 25 No 6, Jun 76 pp 252-256

[Abstract] The characteristics of Czechoslovak-made single-frequency helium-neon lasers, prism interferometers based on these lasers, and separate interferometers are discussed. The uses of these instruments include measurement of distances, velocities, accelerations, oscillations, and the like. The digital output and analog input data permit the use of program-controlled special devices. As an example to illustrate the use of the laser interferometer, the author describes the checking of a dividing machine. The single-frequency lasers come in five wavelengths; the output is 500 mW. Block diagrams are shown for the prism interferometer and the separate interferometer. Figures 11; tables 3; references 10: 3 Czechoslovak, 1 German, and 6 Western.
1/1

USSR UDC 621.373

AKCHURIN, G. G., BOKOV, V. M. and TUCHIN, V. V.

PARTICULARS OF THE ENERGY CHARACTERISTICS OF A HELIUM-NEON LASER IN THE CASE OF DISCHARGE CURRENT MODULATION

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1669-1674 manuscript received 2 Jul 75

[Russian abstract provided by the source]

[Text] An experimental study is made of the energy characteristics of a helium-neon laser in the case of external perturbations of the discharge current. It is shown that the behavior of the energy characteristic can be controlled in the case of plasma perturbations on frequencies close to the frequencies of the normal modes of the discharge. A panoramic method is proposed for observation of characteristics that enables one to study characteristics with high resolution with respect to discharge current. Figures 5; references 7: 6 Russian, 1 Western.

1/1

USSR UDC 621.373.8

ZAKHARENKO, YU.G., PRIVALOV, V.YE., FOFANOV, YA.A.

PECULIARITIES OF THE EFFECT OF OSCILLATIONS IN A DISCHARGE ON THE INTENSITY OF RADIATION OF A GAS LASER

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1901-1909 manuscript received 8 Aug 75

[Abstract] The effect of striations and reactive and local oscillations on the intensity of radiation of He-Ne lasers is investigated. It is found that the effect of reactive and local oscillations on the intensity of radiation of a He-Ne laser amounts to modulation by them of the discharging current. The cut-off frequency of the modulation characteristics of a He-Ne laser can be determined by the resonance properties of the discharge-electrical circuit system. In the case of the presence of traveling striations, modulation of the intensity of radiation of a laser in which tubes of types LG-56, OKG-13 and OKG-16 are used, is principally caused by processes cophasal along all the length of the tube. This is true in all the region of operating currents, also including the case when saturation of the amplitude of traveling striations is observed. The presence of traveling striations leads to the appearance of a standing wave of

1/2

USSR

ZAKHARENKO, YU.G., et al, RADIOTEKHNIKA I ELEKTRONIKA, Vol 21, No 9, 1976, pp 1901-1909

the intensity of spontaneous radiation along the discharge (near the cathode branch); the standing-wave ratio strongly differs from unity with X greater than L. Figures 6; references 9: 5 Russian; 1 Western; 3 Japanese.

2/2

HUNGARY

CSERNOCH, Janos, graduate physicist, technical and scientific advisor, Main Microwave Department, Orion Radio and Electrical Enterprise

CALCULATION OF INTERMODULATION NOISES IN MICROWAVE FDM DEVICES. PART I

Budapest BHG ORION TRT MUSZAKI KOZLEMENYEK in Hungarian Vol 22, No 2, 76 pp 58-70

[Abstract] Intermodulation noises may originate as the result of the characteristics of the non-linear input-output parameter of the quadrupole, the fluctuation of the group-running time of the quadrupole, improper matching of the antenna and the feed line system, and multipath propagation. This article discusses the calculation of intermodulation noise and distortion resulting from the first two of these factors. The methods of calculation are described and illustrated with numerical examples. The example for the first is the following: Second-order intermodulation noise of P_{d2} = 60 pWo and third-order intermodulation noise of p_{d3} = 40 pWo are measured in the f_{12} = 2570 Hz upper channel of the modulator and demodulator (modem short)

1/2

HUNGARY

of a 600-channel device. What are the second-order and third-order linearities of the connection? The examples for the second are the following: For a defined antenna feed line system the time fluctuation of the group-running time, and the minimums or maximums of the group running/frequency diagram range (in the half period of the ripple) are to be calculated; for a given antenna/feedline system, the maximum intermodulation noise for a test channel, the deterioration of the intermodulation noise when the antenna's standing-wave ratio changes are to be calculated. Figures 4; no references.

2/2

EAST GERMANY

FELDNER, S., Karl-Marx-Stadt

APPROXIMATION OF NETWORKS IN THE TIME RANGE

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26, No 8, 1976 pp 284-287 manuscript received 14 Aug 75

[Abstract] Relationships between the time and the frequency ranges. Formulation of the approximation task. Solutions of the approximation problem (approximation in the frequency range, approximation in the time range [approximation by superimposition of elementary functions; nonlinear Chebyshev approximation in the time range]). Nonlinear Chebyshev approximation by exponential series. Numerical calculation of nonlinear Chebyshev approximations by exponential series. Results of the approximation of selected weight functions. Figures 6; table 1; no references.

1/1

EAST GERMANY

KRAMBEER, H., Chamber of Technology, Electrical Technology and Electronics Section, Engineering College, Wismar

REVIEW OF SOME THEORETICAL FUNDAMENTALS OF DEFECT LOCALIZATION IN LINEAR ANALOG CIRCUITS AND SYSTEMS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 8, 76 pp 288-291 manuscript received 10 Sep 75

[Abstract] The literature dealing with the following subjects was reviewed briefly: Defect analysis as a discipline of network theory, determination of the network-element value solvability, solution algorithms for the calculation of parameters from test values, effects of random test errors, determination of the parameters outside the tolerance range, defect analysis by digitalization of the defect effects, defect analysis by simulation of the defect effects, defect analysis and parameter determination, selection of test locations in large systems, optimization of the temporal sequence of the testing steps for large systems. References 29: 5 German, 1 Japanese, 5 Russian, and 18 Western.

1/1

EAST GERMANY

LANGER, Inge, Chamber of Technology, Electronic Technology and Precision Instrument Technology Section, Dresden Technical University, Area: Electronic Instrument Construction, Dresden

POWER SUPPLY LINES FOR HIGH-SPEED INTEGRATED CIRCUITS ON MULTILAYER BOARDS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 25 No 2, 76 pp 74-76 manuscript received 24 Dec 74

[Abstract] The use of potential planes represents the electrically most desirable method of wiring for power supply lines in a high-speed integrated circuit on multilayer board. This provides defined electrical properties to the signal lines, provides electrical shielding and decoupling of the signal lines if the potential planes are properly designed, provides low-impedance power supply for the components on the board, and provides favorable ground line configuration by eliminating the ground wire loops and inductive ground effects. The supply lines are blocked by capacitors to eliminate interference voltage peaks. Examples of wiring based on this principle are presented. Figures 5; references 10: 4 German and 6 Western.

1/1

EAST GERMANY / SOVIET UNION

POLLAK, B. P., HANAMIROV, A. YE., and KORNEYEV, I. V., Moscow Power Institute

MONOCRYSTALLINE AND POLYCRYSTALLINE HEXAGONAL FERRITES AS MATERIALS FOR RESONANCE UNITS IN MICROWAVE TECHNOLOGY

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26, No 7, 1976 pp 245-250 manuscript received 6 Mar 75

[Abstract] This article is the text of the authors' lecture delivered at the 23 to 27 September 1975 IInd International Conference on Microwave Ferrites held in Suhl. Continuing the discussion reported at the XIVth International Conference of Ilmenau Technical University, 1969, on hexaferrites, the authors discuss monocrystalline hexaferrites (tensor of the magnetic susceptibility, hexagonal ferrite elements in waveguides, resonance directional lines) and polycrystalline hexaferrites (approximation for the ferromagnetic resonance, study of the anisotropy of the ferromagnetic resonance, anisotropy of the resonance field, anisotropy of the resonance susceptibility, and a microwave method for the examination of the texture. Polycrystalline hexaferrites permit the construction of resonance system lines of small dimensions in the millimeter wavelength range. Monocrystalline ferrites may also be used for this purpose in some cases. Figures 8; references 8: 4 German, 3 Russian, and 1 Western.

1/1

USSR UDC 621.314.61

TYSHKO, V. A. and POGUDIN, A. I.

A MULTICHANNEL CONTROL SYSTEM BASED ON OPTRON ELEMENTS AND INTEGRATED CIRCUITRY

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 66-70
manuscript received 24 Feb 75; after revision, 23 Dec 75

[Abstract] A simple and economic multichannel synchronous pulse-phase control system is developed with high reliability and acceptable quality characteristics. The system is based on type AOU103 optron thyristors and the K1NT251 integrated circuit. Circuit simplicity is achieved by combining the functions of synchronization and cadence distribution of the output pulses of the phase-shifting devices of the control channels in a single unit. It is shown how correcting elements can be introduced to eliminate output pulse asymmetry. An advantage of the proposed circuit is the absence of coupling between the null detectors of the control channels and the trigger circuits of the output pulse shapers, making the operation of the phase-shifting device immune to interference from the power section of the rectifier. Figures 2; references 4 Russian.

1/1

USSR UDC 621.372.21

LITVINENKO, L.N., OSIPOVA, M.M., SAL'NIKOVA, L.P.

CALCULATION OF CHARACTERISTICS OF TEM-WAVES OF CYLINDRICAL MICROSTRIP LINES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1836-1843 manuscript received 4 Aug 75

[Abstract] Sections of strip lines are widely used in microwave technics as transition devices between various types of transmission lines. The following regular requirements are imposed on such transition devices: insertion into the channel of minimum reflections, wide-bandness, mechanical strength, and others. Strip lines, which can be used in graded coaxial-strip junctions, are of particular interest in connection with them. The present paper -- in an approximation of TEM-waves -- calculates the characteristics of cylindrical microstrip lines with infinitesimally thin strips. The lines are filled with a homogeneous dielectric. In the work the boundary value problem for a Laplace equation is solved by a rigorous method, making it possible to obtain the exact distribution of the potential in a cross-section of the structure. The dependence of the line capacitance, the effective dielectric constant and the wave impedance on the geometrical

1/2

USSR

LITVINENKO, L.N., et al, RADIOTEKHNIKA I ELEKTRONIKA Vol 21, No 9, 1976, pp 1836-1843

parameters of the structure and the dielectric constant of the material was calculated with the aid of an electronic computer. The results of the numerical calculations are presented. Figures 2; references 3: 2 Russian, 1 Western.

2/2

USSR UDC 621.372.22

LITVINENKO, O.N., LEVCHENKO, YE.G.

MICROSTRIP INHOMOGENEOUS LINES AS OSCILLATORY SYSTEMS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1829-1836 manuscript received 15 Jul 75

[Abstract] Oscillatory systems in the form of sections of microstrip lines open at the end are considered. A method is discussed for synthesis of open resonators made from sections of heterogeneous lines. The method makes it possible to find, for a specified resonance frequency, a characteristic resistance and a length L to find the principle of change of the wave resistance, and subsequently--making use of known methods-- to calculate the geometrical dimensions of the resonator. The following points are investigated: 1) The spectrum of the resonance frequencies of an open section of line; 2) Wave resistance of a heterogeneous line; 3) Resonance resistance and Q-factor of an oscillatory system; and 4) Calculation of geometrical dimensions. The authors thank Ya.S. Itskokh for fruitful discussion ofthe theme of the work. Figures 7; references 4 Russian.
1/1

USSR UDC 621.372.22

MATORA, I.M. and SAVVIN, V.A.

THE THEORY OF PULSE SHAPING BY NONUNIFORM SHAPING LINES AT AN ARBITRARY LOAD

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1878-1886 manuscript received 15 Jul 75

[Abstract] The theory is presented of shaping voltage or current pulses with the aid of a nonuniform shaping line (NSL) at a load of arbitrary type, including parameters variable during the pulse. The following types of loads are described: 1) Effective resistance R = const.; 2) Inductive acceleration section of a linear induction accelerator (LIA) composed of a number of identical inductors; and 3) A pulse transformer based on an acceleration section of LIA for an electron gun with loading electron current and bias current. A program for solution of the appropriate systems of differential equations was composed for calculation of the voltage and current pulse at each of these loads. The results of a calculation with respect to the theory presented agree quantitatively with experiment for all loads of importance for which there are experimental data. The authors thank I.M.Frank for a number of valuable comments, P.S. Antsupov and R.V.Khar'yuzov for numerous useful discussions, I.I. Shelontsev for assistance in working out a program, as well as V.G. Zhitenev and A.I. Arlov for completed measurements. Figures 9; references 10: 9 Russian; 1 Western.

1/1

USSR UDC 621.372.63

KRYAZHEVA, O. R. and LANNE, A. A.

ON THE CONDITIONS OF ABSOLUTE STABILITY OF ACTIVE RC CIRCUITS

Moscow RADIOTEKHNIKA in Russian, No 8, 1976 pp 36-40 manuscript received 17 Oct 74

[Abstract] The authors prove theorems on the absolute stability of active RC circuits during variation in capacitances. In the article they examine the theory of active RC circuits and the relationship between the properties of the circuits and their structural features. In addition to being of theoretical interest the article is also of interest for developing rational planning methods. Figures 4; references 4: 1 Russian, 3 Western.

1/1

USSR UDC 621.375.1

KLICH, S. M. and NIKOLAYEV, A. L.

CALCULATING THE DEGREE OF SUPPRESSION OF DIFFERENCE-FREQUENCY HARMONICS IN A BALANCED MICROWAVE MIXER

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1675-1682 manuscript received 20 Jun 75

[Abstract] A method is proposed for calculating the degree of suppression of even-numbered difference-frequency harmonics at the output of a balanced diode microwave mixer for different input signal levels, including strong signals. The calculation is based on piecewise-linear approximation of the current-voltage characteristic and the diode rectification characteristic. It is shown that the degree of suppression of even harmonics higher than the first, like the suppression of heterodyne noises, depends on the imbalance of amplitudes and phases across the diodes of the balanced mixer; this imbalance (and especially phase imbalance) reduces the suppression of even harmonics more strongly than suppression of heterodyne noises. The degree of suppression of a video pulse (zero harmonic) at the balanced mixer output depends only on the imbalance of amplitudes of the microwave bridge in the mixer and the spread among the slopes of the rectification curves of

the diodes used. Factors are distinguished that influence the degree of suppression of even harmonics and a video pulse in a balanced mixer, and ways are suggested to improve this suppression, which is of particular practical importance for AFC radar mixers. Figures 3; references 8 Russian.

USSR UDC 621.375.1

KLICH, S. M. and NIKOLAYEV, A. L.

AN EXPERIMENTAL INVESTIGATION OF THE LEVEL OF DIFFERENCE-FREQUENCY HARMONICS IN MICROWAVE MIXERS IN THE PRESENCE OF A STRONG SIGNAL

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1683-1689 manuscript received 20 Jun 75

[Russian abstract provided by the source]

[Text] The paper gives the results of a comparative experimental study of the levels of the first four difference-frequency harmonics, including the zeroth-order harmonic (video pulse) at the output of simple and balanced diode microwave mixers over a broad range of signal and heterodyne powers. It is found that even in the case of strong signals a balanced mixer suppresses the level of the second (even) harmonic by 12-15 dB, and the zeroth harmonic still more. The results enable one to evaluate the degree of suppression of an interference signal by a balanced mixer where the frequency of the second difference-frequency harmonic is equal to the intermediate frequency, and to choose the optimum working mode of the mixer for AFC radar systems. The experimental results are compared with calculations. Figures 3; tables 3; references 3 Russian.
1/1

USSR UDC 621.382.333

VALIYEV, KAMIL' AKHMETOVICH, DYAGILEV, VLADIMIR NIKOLAYEVICH, LOBEDEV, VALENTIN IVANOVICH and LUBASHEVSKIY, ALEKSEY VASIL'YEVICH

MICROPOWER INTEGRATED CIRCUITS

Moscow MIKROMOSHCHNYYE INTEGRAL'NYYE SKHEMY in Russian, "Sovetskoye Radio," 1975 256 pp

[Excerpt] Annotation

Consideration is given to the circuit-technology and technical features of the design of micropower integrated circuits, greatest attention being devoted to logic elements, universal JK and DV triggers, subsystems of counter type, registers, and adders. Methods are discussed for decreasing the power of circuits, based on simple engineering calculations, as well as the construction or selection of such circuit-technology devices which provide for the least product times lag and the least level of internal noise. Low-level hysteresis logic circuits of the static and dynamic types are analyzed, as well as elements of the TTL and STL types, and elements which unite MDP- and bipolar structures. Questions of the realization of micropower memory circuits are discussed, results are presented of an investigation of the static, dynamic,
1/3

USSR

VALIYEV, KAMIL' AKHMETOVICH, DYAGILEV, VLADIMIR NIKOLAYEVICH, LOBEDEV, VALENTIN IVANOVICH, and LUBASHEVSKIY, ALEKSEY VASIL'YEVICH, MIKROMOSHCHNYYE INTEGRAL'-NYYE SKHEMY, "Sovetskoye Radio" 1975 256 pp

and noise characteristics of bipolar transistors and circuits in a microregime. Physical and technological features of the development of micropower integrated transistors and integrated circuits are set forth.

The book may be useful for engineers working in the field of radioelectronics, computer engineering and electron engineering for students specializing in the field of microelectronics, systems engineering, and digital automation, as well as by developers of large and medium-scale integrated circuits.

Figures 233; tables 24; references 299.

CHAPTER HEADINGS PAGE

Chapter 1.	Characteristics of transistors in a microregime	15
Chapter 2.	Features of micropower transistor models. Noise characteristics and stability of transistors in a microregime	36

2/3

USSR

VALIYEV, KAMIL' AKHMETOVICH, DYAGILEV, VLADIMIR NIKOLAYEVICH, LOBEDEV, VALENTIN IVANOVICH, and LUBASHEVSKIY, ALEKSEY VASIL'YEVICH, MIKROMOSHCHNYYE INTEGRAL'-NYYE SKHEMY, "Sovetskoye Radio" 1975 256 pp

Chapter 3.	Logic circuits in a microregime	45
Chapter 4.	Universal triggers in a microregime	90
Chapter 5.	Static micropower subsystems	116
Chapter 6.	Pulse and pulse-potential micropower circuits and subsystems	129
Chapter 7.	Features of operation and the production technology of a micropower transistor	156
Chapter 8.	Resistors and intracircuit connections	220

3/3

USSR UDC 621.382.825:621.317.799

GOLIK, S. M., GROL', V. V. and VIKTOROV, O. V., ngineers

A TESTER FOR MONITORING THE FUNCTIONING OF LARGE INTEGRATED CIRCUITS WITH A MATRIX STRUCTURE

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian, No 3(87), May-Jun 76 pp 63-64 manuscript received 19 Feb 76

[Abstract] The authors of this article describe the operating principles and give a block-schematic of the tester for monitoring the functioning of large integrated circuits with a matrix structure, developed at the Kiev Polytechnic Institute. They cite the technical characteristics of the tester. In monitoring the permanent storage the tester operates in the read mode. The information written in the memory is compared with information in the standard memory. Figure 1; references 3: 3 Russian.

1/1

EAST GERMANY

KOMPA, S., graduate engineer, Robotron State Enterprise, ZFT [Research and Engineering Bureau], Area: Instruments, Karl-Marx-Stadt

CALCULATION OF THE SIGNAL VALUES OF PHOTOELECTRIC DETECTORS

East Berlin FEINGERAETETECHNIK in German Vol 25 No 6, Jun 76 pp 265-268

[Abstract] The light-technological and the radiation-technological method for calculating the signal values of photoelectric detectors are described. The former method is less accurate and sometimes impracticable. However, it is simpler. In this context, light means visible light and radiation means the entire radiation spectrum including visible light. The basic equation for calculation is $Y = \int E_{e\lambda} F_v(\lambda) S_e(\lambda) d\lambda$, where Y denotes the signal value (in μA), $E_{e\lambda}$ denotes the illumination intensity, $F_v(\lambda)$ denotes the factor of spectral loss, $S_e(\lambda)$ denotes the absolute spectral sensitivity. Examples are presented to illustrate the various methods. Calculation is facilitated if the manufacturers provide meaningful information for their products. Figures 9; no references.

1/1

USSR UDC 522.6:621.396.96

KOLOSOV, M.A., YAKOVLEV, O.I., PAVEL'YEV, A.G., KAYEVITSER, V.I., KALASHNIKOV, I.E., KOZLOV, F.I., KUCHERYAVENKOV, A.I., MATYUGOV,S.S., MOLOTOV, YE.P., ROGAL'SKIY, V.I.

BISTATIC RADAR OBSERVATION OF VENUS USING SATELLITES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian, Vol 21, No 9, 1976, pp 1808-1815 manuscript received 23 Mar 76

[Abstract] The results are presented of bistatic radar observation of the surface of Venus, accomplished with the aid of the "Venera-9" and "Venera-10" satellites. The effectiveness of this method for investigation of planet topography is shown. The results of investigations with respect to two tracks with a length of 1200 and 800 km show that the surface of the planet in the regions indicated is relatively uniform with height differentials not exceeding plus or minus 2 km. The degree of unevenness of the surface, which is characterized by root-mean-square inclinations of unevenness in an area with a diameter of approximately 80 km, is approximately the same as for the surface of the lunar mares. In the case of bistatic radar observation of the surface of Venus, together with a study of the same surface, sounding of the lower strate of the troposphere results, which makes it possible

to broaden the potentialities of the conventional method of radio illumination for investigation of planets with dense atmospheres. The results presented in this paper give initial information concerning two regions of the Venus surface. More complete data will be published in other papers. The authors thank O.M. Rakitin and L.G. Volkov for assistance in the makeup of the paper. Figures 6, references 8: 7 Russian; 1 Western.

USSR UDC 621.391.26:621.396.962.34

LUKOSHKIN, A. P. and PUS', V. V.

SIGNAL DETECTION BY A MULTICHANNEL MONOPULSE RADAR RECEIVER

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 3-10 manuscript received 27 Oct 75

[Russian abstract provided by the source]

[Text] The distribution of voltage readings is determined at the output of a multichannel amplitude sum-difference monopulse radar receiver and used as a basis for examining the problem of signal detection from data of the amplitude and angle-measurement channels. A detection criterion is proposed that is invariant to the perturbing parameters of the problem, its optimality is proved, and the distributions of the statistic of the criterion are found for the hypothesis and alternative. References 8: 6 Russian, 2 Western.

1/1

USSR UDC 621.395.664.12

DAVYDOV, S. A., VYAZOVTSEV, V. N. and DENNENBURG, N. I.

THE SEZ-32 and SEZ-36 ECHO-OBSTRUCTION APPARATUS

Moscow ELEKTROSVYAZ' in Russian, No 7, Jun 76, pp 25-29 manuscript received 15 Apr 75

[Abstract] The authors describe the first echo-obstruction apparatus developed in the USSR -- the SEZ-32V and the SEZ-36. They give the operating principle, the technical and exploitational characteristics of the echo-obstructor, and a description of the components. Preliminary articulation measurements give positive results and indicate that the apparatus may be used on a network in the version having rigid fastening behind the communication channels and also in the version with channel commutation. Figures 7.

1/1

USSR UDC 621.396.6.019.4

RAL'NIKOV, V. I. and KARCHENKO, I. P.

DECENTRALIZED POWER REGULATION IN A RADAR STATION COLLECTIVE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76
pp 43-49 manuscript received 16 May 75

[Abstract] Criteria of independent power regulation in a radar station collective are examined. It is assumed that each station in the collective has its own power regulator that automatically varies the emission power on the basis of local measurements so as to maintain a given working quality in accordance with the proposed criteria. It is shown that the a priori indefiniteness inherent in radar observation can be eliminated by using a power regulation criterion in the form of the ratio of receiver sensitivity to transmitter power rather than the conventional signal-to-noise ratio. An expression is found that relates emission power, threshold level and probability of false alarms in a given station to the characteristics of pulse interference due to emissions from other stations. It is shown that the proposed criteria ensure existence and attainability of an equilibrium position. The effect of decentralized power regulation on the feasible working distance between cw and pulse radars in a collective is discussed. Figures 3; tables; references 5 Russian.
1/1

USSR UDC 621.396.96

BARONKIN, V. M.

EFFECTIVENESS OF DISCRETE DETECTORS IN THE CASE OF A WEAK SIGNAL

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76
pp 1777-1782 manuscript received 11 Jun 75

[Abstract] The author considers the problem of comparing optimum detectors in radar and communications with digital and discrete processing in the weak-signal case for long observation time. The optimality criterion is Pitmann's coefficient of asymptotic effectiveness. The problem is analyzed within the framework of the theory of tests of statistical hypotheses. References 7: 4 Russian, 3 Western.

USSR UDC 621.396.964.2:621.391.82

POPOV, D. I.

SYNTHESIS OF ALGORITHMS FOR ANGLE COORDINATE MEASUREMENT FOR THE CASE OF DISCRETE SCANNING OF AN ANTENNA BEAM

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 118-121 manuscript received 17 Mar 75; after revision 29 Sep 75

[Abstract] It is shown that measurement of the angle coordinate of a fluctuating target with separate data processing for each position of a discrete-scanning antenna beam reduces to computation of a statistic that is invariant with respect to the level of the useful signal and interference. The algorithm for initial data processing is described by an Hermitian form with a processing matrix formed by the correlation matrices of signal and interference. A block diagram is given of a measuring instrument that realizes the proposed algorithms. Figure 1; references 2 Russian.

1/1

USSR UDC 621.396.976(024)

IVANOV, OGEL IVANOV

COOLING OF RADAR APPARATUS

Moscow OKHLAZHDENIYE APPARATURY RLS in Russian, "Voyenizdat" 1975 95 pp

[Extracts] This book studies the influence of temperature on the Norking capacity of radar apparatus and its elements, as well as the basic physical processes which occur during cooling, presents a brief description of the most popular systems for cooling and characteristics of the main elements included in these systems. The peculiarities of operation of radar cooling systems are demonstrated. The book is based on materials from the open domestic and foreign literature. The book is intended for specialists involved in the operation of radar apparatus, as well as readers interested in problems of cooling of electronic equipment.

CONTENTS PAGE

Introduction 3

1/2

USSR

IVANOV, OGEL IVANOV, OKHLAZHDENIYE APPARATURY RLS, "Voyenizdat" 1975 95 pp

1. Influence of Temperature on Working Capacity of Radar Apparatus and its Elements 5
2. Physical Processes of Heat Transfer 13
3. Cooling Systems 24
4. Elements and Devices of Cooling Systems 49
5. Peculiarities of Operation of Cooling Systems 69
6. Safety Techniques When Working With Cooling Systems 89
Bibliography 94

2/2

USSR UDC 621.396.967:629.12(075.3)

SHIROKIKH, IGOR PETROVICH

REPAIR OF SHIPBOARD RADIONAVIGATION INSTRUMENTS

Moscow REMONT SUDOVYKH RADIONAVIGATSIONNYKH PRIBOROV in Russian, "Transport," 1975 172 pp

[Extracts] This book presents methods of locating defects in radionavigation devices and repairing them under shipboard conditions. Their technical operation, regulation and tuning are considered, as well as the testing and measurement apparatus and tools used for these purposes. The book is intended as a teaching aid for students in Merchant Marine schools and can be used by students in courses intended to improve command qualifications, and also as a practical aid for radio specialists and navigators of the merchant and fishing fleets.

CONTENTS PAGE

Chapter I. Reliability of Radionavigation Instruments 3
Chapter II. Technical Operation of Radionavigation Instruments 5
Chapter III. Testing and Measurement Apparatus and Tools 14
Chapter IV. Regulation and Tuning of Radar Sets 28

1/2

USSR

SHIROKIKH, IGOR PETROVICH, REMONT SUDOVYKH RADIONAVIGATSIONNYKH PRIBOROV, Transport," 1975, 172 pp

Chapter V.	Location and Elimination of Defects in Radar Sets	93
Chapter VI.	Regulation and Adjustment of Radio Direction Finders and Receiver-Indicators of Radionavigation Systems	136
Chapter VII.	Location and Elimination of Defects in Radio Direction Finders and Receiver-Indicators of Radionavigation Systems	164

2/2

USSR UDC 621.396.969.1

SIDOROV, YU. YE.

AN INVARIANT RULE FOR DETERMINATION OF TARGET COORDINATES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1759-1762 manuscript received 6 Feb 75

[Abstract] A method is proposed for solving the problem of determining target coordinates that is formulated in terms of the theory of verification of complex statistical hypotheses. The problem is reduced to sequential comparison of target "paths" to find the true "path." A uniformly most powerful invariant rule for verification of hypotheses is derived. This rule is independent of unknown probability characteristics of the observed data and gives the highest probability of the right decision in the class of all invariant rules and in the class of rules with power functions that depend only on signal-to-noise ratio. The algorithm can be realized with digital microelectronic hardware. The author thanks L. A. Zhivotovskiy for valuable advice and for discussion of the work. Figures 2; references 5 Russian.

1/1

USSR UDC 629.7.656.7.621.396.967.2.001(075.8)

GRACHEV, VLADISLAV VASIL'YEVICH, and KEYN, VLADIMIR MIKHAYLOVICH

ELECTRONIC DEVICES FOR CONTROLLING AIR TRAFFIC

Moscow RADIOTEKHNICHESKIYE SREDSTVA UPRAVLENIYA VOZDUSHNYM DVIZHENIYEM in Russian, "Transport" 1975 344 pp

[Extract] This book presents the theoretical principles, operating principles and devices used in modern radar stations and combined automated systems used to control air traffic and the landing of civil aircraft, the principles of their operation and utilization. Basic information is presented from radar theory. Primary attention is given to the most important operational characteristics of radar sets which determine their capabilities in practical use. Radar sets for observing air spaces, radar systems with active response, radar landing systems, radar systems for observing air fields, weather radar sets and automated systems intended for the control of air traffic over tracks, at airfields and intermediate zones are studied. The book is a textbook for students in civil aviation VUZes under the specialty "operation of air transport," studying the electronic devices used to control air traffic, and may also be useful for students in the corresponding specialties of VUZes, for flying and technical personnel in civil aviation and engineering-technical workers.
1/1

USSR UDC 629.7.052:656.7.052.004.2(022)

FROLOV, VLADIMIR SERGEYEVICH

AIRCRAFT NAVIGATION BY MEANS OF INERTIAL NAVIGATION SYSTEMS

Moscow SAMOLETOVOZHDENIYE S POMOSHCH'YU PRIBOROV INERTSIAL'NOY NAVIGATSII in Russian, "Transport," 1975 184 pp

[Extracts] This book analyzes the physical principles upon which inertial navigation is based, as well as methods of using inertial devices in order to increase the accuracy and reliability of aircraft navigation under difficult weather conditions. The principles of utilization of inertial instruments during various stages of a flight are presented. It is shown how inertial instruments during various stages of a flight are presented. It is shown how inertial navigation instruments can be used to increase significantly the accuracy of aircraft navigation, particularly in the polar regions, during flights over terrain without landmarks and at low altitudes. Combined operation of inertial systems with other aircraft navigation systems is studied. The book is intended for the navigator, flight and engineering-technical staff of the Ministry of Civil Aviation, as well as teachers and students at aviation schools.

1/4

USSR

FROLOV, VLADIMIR SERGEYEVICH, SAMOLETOVOZHDENIYE S POMOSHCH'YU PRIBOROV INERTSIAL'NOY NAVIGATSII, "Transport," 1975 184 pp

CONTENTS PAGE

Chapter I.	Principles of Inertial Navigation	3
	1. Newton's Laws	3
	2. Systems of Coordinates	4
	3. Determination of Parameters of Motion	7
Chapter II.	The Field of Gravity and Its Anomalies	9
	1. Types of Reference Elipsoids	9
	2. Gravitational Anomalies	11
Chapter III.	The Operation of Inertial Systems With a Gimbal Support	13
	1. The Geographic Gyroorientor	13
	2. Precession of a Gyroscopic Platform	18
	3. Basic Equations of Inertial Navigation	21
Chapter IV.	Nongimballed Inertial Systems	27
	1. Dynamics of a Nongimballed System Based on Two Gyroscopes With an Electrostatic Suspension	27
	2. Analysis of Errors	37

2/4

USSR

FROLOV, VLADIMIR SERGEYEVICH, SAMOLETOVOZHDENIYE S POMOSHCH'YU PRIBOROV INERTSIAL'NOY NAVIGATSII, "Transport," 1975 184 pp

Chapter V.	Existing and Prospective Inertial Elements	43
	1. Accelerometers	43
	2. Gyroscopic Sensors	60
	3. Laser Gyroscopes	63
Chapter VI.	Basic Limitations on Inertial Navigation	67
Chapter VII.	Testing the Accuracy and Reliability of Inertial Systems	74
	1. "White Rooms" for Testing of INS Elements	74
	2. Modeling of the Operation of INS in Flight	77
	3. Flight Testing	87
	4. Automatic Testing and Measurement Apparatus	89
Chapter VIII.	Combination of Inertial Systems With Radio-navigation Equipment	93
	1. Combined Utilization of Sources of Navigational Information	93
	2. Doppler Course Velocity and Drift Angle Meter and Its Errors	100
	3. Aircraft Inertial-Doppler Systems	116

3/4

USSR

FROLOV, VLADIMIR SERGEYEVICH, SAMOLETOVOZHDENIYE S POMOSHCH'YU PRIBOROV INERTSIAL'NOY NAVIGATSII, "Transport," 1975 184 pp

	4.	Principles of Optimal Kalman-Buisi Filtration	118
	5.	Optimal Radio-Inertial Complex for Aircraft Navigation	127
	6.	Indicators of a Complex Navigation System	137
Chapter IX.	Use of Inertial Systems in Aircraft and Helicopters		147
	1.	Simplified INS	147
	2.	INS for Flight in Polar Regions	149
	3.	Inertial-radiothermal System	151
	4.	Programming Device for Automatic Display	153
	5.	Use of INS in Aviation Trainers	162
	6.	The Evolution of Navigational Computers	164
	7.	Trends in the Development of Inertial Systems	171
Bibliography			181

4/4

EAST GERMANY

LENK, A., Dresden Technical University, Information Technology Section; Area: Communication and Test-Value Acquisition, Dresden

DISCRETE AND INTEGRATED SEMICONDUCTOR TRANSDUCERS

East Berlin MESSEN-STEUERN-REGELN in German Vol 19 No 7, Jul 76 pp 246-251

[Abstract] This article discusses the properties of modern strain gauges, temperature effects in resistance-based strain gauges, the power transmission factor as a measure for the error effect of the follower electronic system and the loading of the test specimen, the power transmission factor of acceleration gauges, and the power transmission factor of piezoresistive pressure transducers. Leading manufacturers gradually switch from metal transducers to semiconductor transducers. The advantages of the latter are particularly pronounced for compression measurement at the present state of the art. Semiconductor integrated transducers already predominate in medical uses. Figures 10; tables 2; references 3: 2 German and 1 Western.

1/1

EAST GERMANY

SCHLEGEL [initial(s) not given]

NEW LINEAR INTEGRATED CIRCUITS FROM THE FRANKFURT (ODER) SEMICONDUCTOR FACTORY

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 17, Sep 76 pp 551-556

[Abstract] The following new monolithic integrated circuits, intended primarily for use in consumer electronic devices, are described and illustrated with drawings, circuit diagrams, block diagrams, and specification tables: A 205 (low-frequency amplifier for radio, television, and phono sets, with an output of 5 W under maximum cooling. Available in versions A 205 D and A 205 K, differing in the ability of accommodating external cooling system); A 230 D (RGB [red-yellow-blue] matrix for color television devices for the direct control of the video terminal stage; a 16-pole unit); AD 240 D (an integrated ZF [intermediate frequency] amplifier for back-and-white and color television devices containing a controlled ZF amplifier, picture-delay-controlled demodulator and a video post amplifier); A 250 D (integrated

1/2

EAST GERMANY

SCHLEGEL, RADIO FERNSEHEN ELEKTRONIK Vol 25 No 17, Sep 76 pp 551-556

horizontal combination for pulse detachment and line synchronization in television devices with transistorized line terminal stages); A 270 D (an amplifier combination for the video and brightness signal, as well as functional groups for beam-current limitation, black-value scanning, and brightness control); A 295 D (for use in SECAM decoders, consisting of intermediate switch, limiter, and color-channel switch); A 301 D (a combination of stabilizer, amplifier, and threshold-level switch, intended for inductive slot, approximation, and ring initiators primarily, with ability to be modified for a variety of other uses). Figures 19; tables 7; reference 1: German.

2/2

USSR UDC 539.216.2

BORZYAK, P.G., KATRICH, G.A., and SAMOYLOV, V.S.

FORMATION OF THE BAND STRUCTURE OF GOLD IN "ULTRATHIN" ISLAND FILMS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1919-1923 manuscript received 24 Jun 75

[Abstract] Previous works, of which G.A. Katrich was a co-author, studied the energy spectra of photoelectrons emitted by gold films and the optical characteristics of these films in the region of the spectrum with energies of the photons less than 5 ev. Analysis of the results obtained made it possible to determine the energy position of a number of extremal points of the band structure of gold, as well as the energy of some typical optical transitions. It was shown that the energy band structure, typical for massive gold, is retained to a thickness by weight of 10 Å for films of all the range of thicknesses investigated. The present paper extends the above investigation to a study of the changes in the electron states to which a transition to still "thinner" films leads, and the minimum "thicknesses" at which formation begins of the electron band structure of gold in "ultrathin" island films. The energy spectra of photoelectrons emitted by gold films with a work function of 2.1 ev, and a thickness

1/2

USSR

BORZYAK, P.G., et al, RADIOTEKHNIKA I ELEKTRONIKA Vol 21, No 9,1976, pp 1919-1923

by weight from 0.4 to 10 A was studied in the spectral region $h\nu \leqslant 5$ ev. A substrate for the film was developed with sufficient conductivity and which at the same time provided nonphotosensitivity in the region of the spectrum used. The thickness by weight of the films deposited was determined by the piezoquartz resonator method. It is shown that in islands with linear dimensions of 40-50 A, from which the gold film with a thickness by weight of 10 A is made, an energy band structure is formed, characteristics of massive metal. Further "thinning" of the films and the decrease of the island dimensions connected with it leads to a considerable change of the S-band;conversely, the structure of the D-band remains invariable with thinning of the films to a thickness by weight of 1 A. Figures 4; references 4: 2 Russian; 1 Western; 1 Hungarian.

2/2

USSR UDC 621.373.51:621.382.2

PROKHOROV, E. D., SKOROBOGATOVA, S. N. and ZOLOTAREV, YE. S.

EMISSION OF MICROWAVE NOISE BY A GUNN DIODE WITH STATIC CATHODE DOMAIN

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1732-1739 manuscript received 10 Jul 75

[Abstract] An investigation is made of conditions of onset of impact ionization in static cathode domains. It is shown that impact ionization may arise at the cathode in Gunn diodes where there is a high-resistance region with characteristics that differ from the gallium arsenide body of the diode. Conditions are defined under which this situation can be experimentally realized. It is hypothesized that a Townsend avalanche effect may occur in the static cathode domains of Gunn diodes. Emission of microwave noise is experimentally observed in Gunn diodes with a strong electric field at the cathode, demonstrating the validity of this hypothesis. The measured spectral density of noise power in the 8.8-9.8 GHz band emitted by this type of structure is $\sim 10^5$-10^6 kT_0. It is suggested that coherent waveforms could be stimulated by the Townsend avalanche effect with appropriate gradient doping of the n_0 region in Gunn diodes. Figures 5; references 16: 7 Russian, 9 Western.
1/1

USSR UDC 621.382.2

KARAKUSHAN, E.I., FATTAKHDINOV, A.U., and KHONYAK, YE.I.

MAGNETODIODE AS A CONTROLLABLE RESISTOR

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1941-44 manuscript received 30 Jun 75

[Abstract] A comparison is made of a magnetodiode with a magnetoresistor as a controllable dynamic resistor. A number of advantages of the magnetodiode are discussed. Possible fields of application of a magnetodiode as a controllable resistor include: 1) Attenuators with a variable transmission factor; 2) Amplifiers with adjustable magnitude of feedback; and 3) Magnetic field sensor [datchik]. The authors thank V.I. Murygin for reading the manuscript and discussion of the results obtained. Figures 4; references 5 Russian

1/1

USSR UDC 621.382.3

PRYANISHNIKOV, V. A. and ISAYEV, V. T., Leningrad Institute of Precision Mechanics and Optics

A DEVICE FOR SELECTING MATCHED PAIRS OF FIELD-EFFECT TRANSISTORS

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 8, 1976 pp 83-86 manuscript received 26 Feb 76

[Abstract] The authors describe a measurement installation for selecting paired FETs that ensures ratios of initial drain current and transconductance of at least 0.95. The FET is connected as a common-drain amplifier in the negative feedback circuit of an opamp, the drain-source voltage and drain current are obtained from special power supplies, a 1000 Hz signal is applied to the opamp input, and a variable resistor in series with the drain current supply is adjusted to give zero opamp output. The transconductance is determined from the value of this resistance, and the drain current to transconductance ratio is determined from the voltage drop across this resistance. Measurement results are given for type KP103 FETs. Figures 1; tables 2; references 1 Russian.

1/1

USSR UDC 621.372

KOROTICH, A. F. and MYZYCHKO, YE. M., engineers

FM-SIGNAL DEMODULATOR BASED ON INTEGRATED CIRCUITS

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian No 3(87), May-Jun 76 pp 72-74 manuscript received 24 Nov 75

[Abstract] The authors of this article examine a simple FM-signal demodulator made on a synchronous phase detector circuit on the basis of modern integrated microcircuits. They state that the use of integrated microcircuits in the synchronous phase detector has permitted improving its parameters such as the holding band and the retention band and increasing the degree of linearity of the modulation characteristic in its working part. Figure 1; references 4 Russian.

1/1

USSR UDC 621.373.4.029.64

AFANASOV, S.G., ASHBEL', I.YA., PETROV,S.G., and CHEREDNIK, V.I.

COMPARATIVE CHARACTERISTICS OF THE OPERATING CONDITIONS OF SINGLE-TRANSIT RETARDING-FIELD OSCILLATORS FROM THE POINT OF VIEW OF THE POSSIBILITY OF THEIR MICROMINIATURIZATION, LOWERING OF THE OPERATING VOLTAGE AND AN INCREASE OF EFFICIENCY

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1910-1918 manuscript received 27 Jan 75

[Abstract] The special features of retarding-field oscillators (RFO), operating under various conditions are considered from the point of view of microminiaturization and an increase of efficiency. Available theoretical and experimental investigations of RFO in a multi-transit regime do not make it possible at present to draw conclusions concerning their prospects with respect to microminiaturization. However, it has been experimentally shown in the literature that the simplicity of construction and the relatively high control of the movement of electrons in a RFO operating in a single-transit regime make it possible to a considerable degree for the parameters of real devices to approach theoretical values. However, in theoretical

1/2

USSR

AFANASOV, S.G., et al, RADIOTEKHNIKA I ELEKTRONIKA Vol 21, No 9, 1976, pp 1910-1918

terms this regime is not completely understood. Consequently, the present paper is limited to a consideration of the special features of RFO in a single-transit regime with various mechanisms for excitation of high-frequency oscillations. The analysis shows that from the viewpoint of economy and the start-up properties of low-voltage RFO with high-perveance beams the most preferable is a "resonance" regime with phase focusing. This was confirmed by experimental investigations which showed that in this regime a RFO can generate microwave oscillations with a reduction of the supply voltages to 1.5--2.5 volts with an efficiency of 2.5--3 percent. The authors thank M.I. Kuznets for discussion of the results and a number of helpful opinions. Figures 7; tables 1; references 17: 14 Russian; 3 Western.

2/2

USSR

UDC 621.373.43

BERMAN, V. R., FROLKIN, V. T., SOLOVEY, M. S. and VOLOSHCHENKO, V. I.

A MAGNETIC SCANNING OSCILLATOR WITH DEFLECTING COIL CONNECTED IN THE COLLECTOR CIRCUIT OF THE FINAL STAGE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 17-22 manuscript received 29 Apr 75

[Abstract] An investigation is made of transient processes in a magnetic scanning oscillator with two-cycle and single-cycle deflecting coils connected in the collector circuits of the final push-pull stage. The minimum time of damping of transient processes and the corresponding optimum value of the shunting resistance of the deflecting coil were determined by mathematical modeling on the MN-7 analog computer. The results show that over a wide range of amplification factors the speed of the oscillator and the optimum shunting resistance are practically independent of gain and are determined only by the passband of the preamplifier. On the other hand, the minimum damping time is appreciably dependent on the preamplifier passband: speed improves by a factor of more than 5 with an increase in passband from 15 to 500 kHz. Figures 6; references 4 Russian.

1/1

USSR UDC 624.373.5

PLONSKIY, A. F. and TEARO, V. I.

STABILITY OF THE FREQUENCY OF A QUARTZ AUTOGENERATOR WITH A LINE SEGMENT

Moscow RADIOTEKHNIKA in Russian No 8, 1976 pp 49-54 manuscript received 28 Apr 75

[Abstract] The authors make a theoretical and experimental study of the autogenerator with quartz resonator excitation through a segment of coaxial cable. They show the possibility of such excitation for creating highly stable quartz generators and precision measurements. Although the concept is not entirely new, experts in the field still do not agree completely in evaluating the influence exerted on the stability of frequency of generating oscillations by the line parameters. Figures 4; table 1; references 12: 12 Russian.

1/1

EAST GERMANY/SOVIET UNION

WERZ, H. J., Chamber of Technology, East Berlin

IMPROVEMENT AND CLASSIFICATION OF FAST FOURIER TRANSFORMATION

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 2, 76 pp 45-47
manuscript received 19 Feb 75

[Abstract] This article is an abbreviated version of the author's dissertation (prepared under Professor W. A. Taft, Ph. D., Transportation University, Moscow, 31 May 1974). The following tasks are solved for the general case of factorization of the number of support points of the function to be analyzed or synthesized in a product of integer factors: Finding of a simple method for the classification of all fast Fourier transformation algorithms of interest in connection with practical calculations and minimization of the number of the multiplications to be performed in the realization of the fast Fourier transformation. The latter is also useful for error checking in the processing of fast Fourier transformations. Tables 3; references 6: 2 German, 1 Russian, and 3 Western.

1/1

USSR UDC 621.376.4

BILENKO, D.I., ZHARKOVA, E.A., and KHASINA, YE.I.

MODULATION OF REFLECTED RADIATION OF MILLIMETER AND SUBMILLIMETER WAVELENGTH RANGE ON THE BASIS OF DIODE SEMICONDUCTOR STRUCTURES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 2021-2023 date manuscript received not shown

[Abstract] In previous works by the authors the possibility was considered of control of reflected radiation with current injection in diodes, the plane p-n junction of which is perpendicular to the direction of propagation of the wave. The calculations made of the coefficient of reflection from the structures indicated showed a pronounced dependence of the phase and amplitude of the coefficient of reflection on the properties of the structure. Choice of the thickness of the diode base and the current density determines the form of modulation: amplitude-phase or phase (to 2π) with a small change of amplitude. The method of control considered can be used in the infrared, submillimeter and millimeter wavelength range. The most effective modulation is possible in the submillimeter range because for control of radiation in this case, e.g., with silicon structures, excitation is required of actually attainable concentrations of charge carriers of (1-5) . 10^{16} cm^{-3} in a thickness of 1/2

layers comparable with the diffusion length in material with high levels of excitation (80--100 micron). The present short communication presents the results of an experimental investigation of control of reflected radiation of the short part of the millimeter range, based on diode elements, as a function of the properties of the structure and the conditions of injection. The control obtained can find wide applications for control of radiation in wave guide channels and in free space. Under equal conditions the change of phase increases in proportion to the increase of frequency. An increase of the magnitude of the controlled phase shift can be attained by use of heterostructures and structures with accumulation of charge. Figures 2; references 3 Russian.

2/2

USSR UDC 621.391.2

GERTSENSHTEYN, M.YE. and KOBZEV, V.V.

CONCERNING A THERMAL RECEIVER WITH LASER READING OF TEMPERATURES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1936-1940 manuscript received 7 Apr 75

[Abstract] The physical aspects are considered of the problem of creating a thermal receiver in which noise of the temperature reading system is less than the thermodynamic fluctuations of the temperature of the sensing element [datchik] which is heated by the radiation received. In order to increase the sensitivity, the sensing element must have minimum dimensions and be made from a substance the index of refraction of which depends on the temperature -- e.g., liquid crystals. The sensing element is illuminated by a laser beam, and the change of phase of reflected or passing waves is registered. Only a laser system of reading makes it possible to realize maximum sensitivity of a bolometer. Assuming the sensing element has a diameter of 10 microns and a thickness of 10 microns with a dielectric constant $\epsilon = 3$, the threshold value with laser readout of the capacitance amounts to $\Delta C = 5.10^{-14}$ pf. It is extremely difficult to measure such small values at radio frequencies. References 20: 15 Russian; 4 Western; 1 Russian translation of US patent.

1/1

EAST GERMANY

GEWENIGER, S., and JOERGES, U., Chamber of Technology, Dresden

DAMPING OF GLASS-FIBER WAVEGUIDES WITH A SECOND, LOSSY SHEATH

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 7, 76 pp 273-275
manuscript received 22 Sep 75

[Abstract] A DAEMPF program, written in BESM-6-FORTRAN, is now available for calculating the damping of light waveguides by a second, lossy mantle
There are two limitations to the program: (1) The damping constant (α) is calculated from the expression $\alpha = P_V'/2P$, where P denotes the is the power transmitted by the core (assumed to be loss-free) and the first sheath; (2) the boundary layer between the 1st and 2d sheaths is assumed to be planar. Typical results, for a waveguide with the following parameters, are presented: core diameter, 35 μm; core refraction, 1.62; sheath refraction coefficient, 1.58; wavelength, 0.9 μm. The applications of this method for designing of waveguides of this type are discussed briefly. Figures 2; reference 1: German.

1/1

HUNGARY/WEST GERMANY

RETZ, GUENTHER, marketing director, AMP Deutschland, Langen, West Germany, and SZALAY, MIKLOS, Dr, technical and economic advisor, Central Research Institute for Physics, Budapest

DESIGN AND ASSEMBLY TECHNIQUES FOR CONNECTORS BASED ON MODULES

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 15 No 9, Sep 76
pp 257-262

[Abstract] The authors describe briefly the "M" series of modular connectors offered by the AMP company. This series features versatility and high connecting element density, approximately five per square centimeter. The various elements and modules were described and illustrated with drawings, photographs, and specification charts. The two major categories of connectors involved include (a) connectors for high current transmission or signal transmission, with twisted or solid wire, and (b) connectors for high-frequency uses and the transmission of high-speed pulses. Information is provided about the contact surfaces, wiring and assembly of the modular connectors and the insulating housing, and accessories. Figures 15; table 1; no references.
1/1

HUNGARY

Mrs SARKOZY, GEZA, Dr, scientific department head, HIHI [Communications Engineering Industry Research Institute]

TECHNIQUES IN THE MANUFACTURE OF PRINTED CIRCUITS

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 15 No 8, Aug 76
pp 252-254

[Abstract] The proceedings of a symposium held on 22 October 1975 at the Hungarian Chamber of Commerce were briefly described. Two West-German representatives spoke at the symposium. G. Decker, representing Chemcut GmbH in Solingen, spoke about etching, which is an important part of the manufacture of printed circuits. He discussed the classification of the etching devices and outlined their design features. Engineer Dr Tillensen, representing Isola Works in Duren, spoke about the latest achievements in the field of substrate materials for printed circuit boards, and discussed the fundamental aspects of the additive and multilayer technique materials. The speakers featured the products and methods of their respective concerns. Figures 4; tables 2; no references.

1/1

HUNGARY/WEST GERMANY

WEISSKOPF, ROLAND, marketing director, AMP Deutschland, Langen, West Germany, and KOVACS, ERVIN, graduate electrical engineer, technical advisor, Agentura Limited, Budapest

THE TECHNOLOGY OF SOLDERELESS CRIMPED CONNECTIONS

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 15 No 9 Sep 76
pp 263-266

[Abstract] The materials used in solderless crimped joints must be corrosion-resistant, easily formable, and springy. Both twisted and solid wires may be used, most connectors are made of copper. The connecting component, which crimps the wires together must provide large contact area and a gas-tight seal. The major physical characteristics of the connections are the elastic recovery force, the axial recovery force, the cold-welding of the surface peaks, and reliability. Expressions characterizing these were provided. Tools for accomplishing the crimping were described and illustrated. They include the stripper-crimper, the certi-crimp, and the AMP-O-MATOR, all used by the AMP company. Figure 9; no references.

1/1

USSR

UDC 535.375.5

LUGOVOY, V.N., and STREL'TSOV, V.N.; Physics Institute imeni P.N. Lebedev, Academy of Sciences, USSR, Moscow

ON THE POSSIBILITY OF GENERATION OF FEMTOSECOND PULSES IN THE CASE OF STIMULATED RAMAN EMISSION IN OPTICAL RESONATORS

Moscow KVANTOVAYA ELEKTRONIKA, in Russian, Vol 3, No 8, Aug 76, pp 1793-1799 manuscript received 9 Mar 76

[Abstract] The process of stimulated Raman emission (SRE) in an optical resonator which was discussed in three previous papers by V.N. Lugovoy and in a number of other works is summarized. Up to the present regimes of generation of SRE in resonators, with participation of anti-Stokes components were not considered, which is warranted for the case of a sufficient dispersion of the refractive index of an active medium or for the case of a medium without dispersion with sufficiently large losses of the resonator at anti-Stokes frequencies. In the present paper steady-state generation of SRE in an optical resonator is considered for the case of a medium without dispersion in the region of anti-Stokes frequencies with relatively small losses of the resonator in this same region, and

the special features of the excitation of anti-Stokes components under these conditions are ascertained. A resonator is postulated, filled up to the brim by a medium active in the SRE spectrum, and the mirrors of the resonator reflect well, both at the SRE components under consideration and at the frequency of the exterior exciting beam. It is also assumed that the exterior beam is monochromatic and falls on the resonator axis, axciting one of its axial types of oscillation. As regards the transverse modes, it is assumed that in the resonator their selection is accomplished so that only the natural oscillations with the minimum transverse index can be excited, and is characterized only by values of the axial index. Cases are considered where in the Stokes region only one first Stokes component is generated and the dispersion of the refractive index of the medium is practically absent. Excitation of the anti-Stokes component of SRE in these conditions is considered. Various cases of the frequency dependence of the resonator losses are investigated. Conditions are found in which a large number of anti-Stokes components with nearly equal values of intensities are excited when the

USSR

LUGOVOY, V.N., and STREL'TSOV, V.N., KVANTOVAYA ELEKTRONIKA, Vol 3, No 8, Aug 76, pp 1793-1799

total anti-Stokes output radiation from the resonator constitutes a periodic sequence of ultrashort (femtosecond) pulses with a single pulse at a period. References 11: 10 Russian; 1 Western.

3/3

USSR UDC 621.318.124

KOLEDENKO, G. P., MIROSHKIN, V. P., PANOVA, YA. I. and PASYNKOV, V. V.

PERMEABILITY SPECTRA OF MANGANESE-ZINC FERRITES

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 71-74 manuscript received 2 Jun 75; after revision, 25 Sep 75

[Russian abstract provided by the source]

[Text] The authors study the magnetic spectra of grades 1500NM3, 2000NM1, 6000NM and 10000NM ferrites in the frequency range of 0.001-100 MHz. To obtain data close to the spectra of the material, the measurements were done on annular cores of the minimum standard size. Simple approximate curves are proposed for the frequency dependence of μ' and μ'' that agree with experimental data within the limits of rms deviations for the investigated batches of specimens. Figures 2; tables 2; references 7 Russian.

1/1

USSR UDC 621.372.8

UDALOV, V. V. and POPOV, V. A.

A POLARIZATION DEVICE FOR THE MILLIMETER AND SUBMILLIMETER BANDS FOR MULTI-MODE RECTANGULAR WAVEGUIDES

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76 pp 1748-1749 manuscript received 7 Jul 75

[Abstract] The article gives the results of studies of a polarization device that can be used as a basis for construction of waveguide attenuators, couplers, modulators and other elements. An E-polarized input signal enters an element that rotates the plane of polarization -- a circular waveguide containing a ferrite rod with an external magnetizing coil -- through a tapered adapter. The wave is rotated by the Faraday effect when the current in the magnetizing coil is changed. The arbitrarily polarized output wave then enters a polarizing element through a tapered adapter. The polarizer is a rectangular waveguide coupler with periodic structures in the side walls that utilize anisotropy to couple out the H-polarized component, allowing the E-polarized component to pass through without losses. When the length of the coupling section is properly chosen, the H-polarized part of the wave energy is recovered from two side branches, while the E-component with orthogonal polarization passes through. Figures 1; references 6 Russian.
1/1

USSR UDC 621.372.8:621.315.61

ZOLOTOV, YE.M., KISELEV, V.A., PROKHOROV, A.M., and SHCHERBAKOV, YE.A.; Physics Institute imeni P.N. Lebedev, Academy of Sciences, USSR, Moscow

DETERMINATION OF PARAMETERS OF OPTICAL DIFFUSION MICROWAVEGUIDES

Moscow KVANTOVAYA ELEKTRONIKA, in Russian, Vol 3, No 8, Aug 76, pp 1672-1676 manuscript received 24 Oct 75

[Abstract] Optical waveguides produced by the diffusion of various elements into glasses and single crystals have recently received wide application in integral optics. The principal characteristic of a diffusion waveguide is the distribution of the refractive index n(x) with respect to its cross section, which determines the optical properties of the waveguide. The present work proposes a method of determining the refractive index profile by the measured values of the effective refractive index n_m^*. This method is suitable for both multimode and single-mode waveguides. In particular the method does not require determination of the parameter Δn. An approximation of n(x) is accomplished by a combination of two functions (parabolic and exponential) which are varied, and
1/2

USSR

ZOLOTOV, YE.M., et al, KVANTOVAYA ELEKTRONIKA, Vol 3, No 8, Aug 76, pp 1672-1676

conformity to the distribution sought is found with the aid of a family of universal dispersion curves. In the case of measurements at one wavelength it is sufficient to determine n_m^* for three modes; if the waveguide is single-mode it is necessary to measure n_m^* at three wavelengths. The characteristics of a diffused waveguide in glass are determined experimentally. The method proposed in the paper is suitable (with an appropriate choice of the approximating functions) for determination of the parameters of "submerged" diffusion waveguides, i.e., waveguides in which the maximum value of the refractive index $n_1 + \Delta_n$ is attained at a considerable distance from the waveguide surface. Figures 5; tables 1; references 11: 2 Russian; 9 Western.

USSR UDC 621.372.544

BACHININA, YE.L., GAYDABURA, I.S., and FEL'DSHTEYN, A.L.

HARMONIC FILTER ON A PERIODIC EXPONENTIAL LINE

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1989-2002 manuscript received 4 Aug 75

[Abstract] Until very recently harmonic filters (HF) based on heterogeneous lines did not have wide use because of difficulties in construction of a synthesis theory as well as the technological complexity of realizing the filters. At present these difficulties have been overcome by use of computing technics and by the technology of printed circuitry. In the process the qualities of the filters in question become appreciable. The chief of them is the smoothness of change of the configuration and, consequently, the low level of parasitic effects caused by nonpropagating higher wave types. This enables a significant shift of the operating range of a HF to the side of short wavelengths. A heterogeneous line, fulfilling the function of a HF, must have a periodic structure, because in this case storage takes place of the reflections at the harmonic frequencies. The present paper discusses a structure in the form of 1/2

USSR

BACHININA, YE.L., et al, RADIOTEKHNIKA I ELEKTRONIKA Vol 21,No 9, 1976, pp 1989-2002

a so-called periodic exponential line (PEL). The parameters, magnitude, the geometries of single units on which a PEL is constructed, and illustrations of a single unit and a HF on a PEL are presented in table form for two HF. It is found that, in accordance with a fixed lemma, a large signal-to-noise ratio, a set of signals which is defined by a twisted cube is optimum. The noise immunity is compared of signals corresponding to a twisted bue and a hexahedron. On the basis of the results obtained it is concluded that a set of signals corresponding to a twisted tube is optimum. Binary signals, possessing in practice the same potential noise immunity can be considered quasi-optimum, but so long as they are considerably simpler to realize, then their use is more preferable. Figures 3; tables 2; references 6: 5 Russian; 1 Western.

2/2

USSR UDC 621.372.81.09

BELANOV, A.S., DIANOV, YE.M., YESHOV, G.I., and PROKHOROV, A.M.; Physics Institute imeni P.N. Lebedev, Academy of Sciences, USSR, Moscow

ON THE PROPAGATION OF EIGEN WAVES IN MULTILAYER OPTICAL WAVEGUIDES. II. ENERGY CHARACTERISTICS

Moscow KVANTOVAYA ELEKTRONIKA, in Russian, Vol 3, No 8, Aug 76, pp 1689-1700 manuscript received 26 Nov 75

[Abstract] This paper is a continuation of a previous paper by the authors [Kvantovaya elektronika, 3, 81 (1976)]. The present work analyzes the energy characteristics of circular laminated waveguides which include a dielectric core of a radius a with a refractive index n_1, an encircling first envelope with an external radius b and a refractive index n_2. The refractive index of the second external envelope is n_3. The investigation was conducted for six types of waveguides with a direct variation of the refractive index of the layers. The following designations are taken for convenient analysis: $\epsilon_1 = n_1^2/n_2^2$, $\epsilon_3 = n_3^2/n_2^2$, $c = a/b$. In contrast to earlier investigations conducted by the authors, final standard working formulas are obtained which make it possible to calculate the necessary

1/2

USSR

BELANOV, A.S., et al, KVANTOVAYA ELEKTRONIKA, Vol 3, No 8, Aug 76, pp 1689-1700

parameters of laminated dielectric waveguides. Specifically, strict and approximate expressions are derived for the axial energy flow, for powers propagating in waveguide layers and for the eigen waves attenuation factor. To estimate the field area occuped by the wave, an effective diameter of the waveguide cross section is introduced through which 99 percent of the total wave energy flow propagates. Results are presented of calculations of the energy characteristics for five lowest-order modes in the wide range of variations of the waveguide layers parameters. Possible development of a self-filtering waveguide is shown. Figures 13; references 5: 3 Russian; 2 Western.

2/2

USSR UDC 621.372.852

ZAV'YALOV, A. S. and PEGOV, A. A.

A WIDE-BAND PHASE SHIFTER ON A CIRCULAR WAVEGUIDE

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 90-93 manuscript received 6 Jan 75; after revision, 30 May 75

[Abstract] An approximate method is proposed for calculation of a phase shifter that is a section of circular waveguide with two diametrically opposed thin metal plates, the edges of which are equipped with a decelerating system formed by a series of cuts in the plates to compensate for phase shift dispersion. A distinguishing feature of the design is that the phase-shifting elements have practically no effect on propagation of waves with electric vector perpendicular to the plates. Estimates are made of the ranges of values within which the parameters characterizing the system must be varied (notch depth, height of the plates, period of the structure) for optimum operation. It is found that the cuts should be 1/4-1/6 as wide as the spacing between them, and no deeper than 1/4 of the minimum working wavelength. When the ratio H/R of plate height to waveguide radius is 0.4, the plate length should be (5-6)R, and thickness should be (0.05-0.06)R. The plates are beveled for better matching. Figures 4; references 5 Russian.

1/1

USSR UDC 621.373

MESHKOV, A. N. and SHISHKO, V. I.

HIGH-POWER NANOSECOND PULSE TRANSFORMERS

Kiev IZVESTIYA VUZov, RADIOELEKTRONIKA in Russian Vol 19, No 8, Aug 76 pp 54-59 manuscript received 24 Feb 75; after revision, 29 Dec 75

[Russian abstract provided by the source]

[Text] An examination is made of the basic particulars of processes in a pulse transformer when pulse duration is reduced to 1-100 ns at a power level of hundreds of kW. A procedure for design of a pulse transformer is presented that accounts for the magnetic viscosity of the core material, commensurability of magnetic field strength and core magnetization, and the properties of ferromagnetics in strong magnetic fields. Figures 3; references 8: 6 Russian, 2 Western.

1/1

USSR UDC 681.3.06

AL'TSHUL', SEMEN DAVIDOVICH, candidate of technical sciences, GSKB [State Special Design Office], SKA (Leningrad), GIL'MAN, GENNADIY IVANOVICH, candidate of technical sciences, GSKB SKA (Leningrad), PEN'KINA, TAT'YANA VISSARIONOVNE, engineer, GSKB SKA (Leningrad), and RAPOPORT, YEFIM ZELIKOVICH, engineer, GSKB SKA (Leningrad)

AN ALGORITHM FOR PRINTED CIRCUIT LAYOUT

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4(24), Jul/Aug 76 pp 109-114 manuscript received 4 Apr 75

[Russian abstract provided by the source]

[Text] An algorithm for laying out printed circuits is proposed that is based on an algorithm of search for the optimum path in an orthogonal grid, and that minimizes the total length of the corresponding tree in construction of each alternative circuit. To reduce the number of unrealized connections, the algorithm provides for uniform distribution of conductors over the plate, and optimization of separable connections. Figures 2.

1/1

HUNGARY UDC 621.316.5.017.71

IMRE, LASZLO, Dr, graduate mechanical engineer, candidate of technical sciences, lecturer, and DANKO, GYORGY, graduate mechanical engineer, assistant professor, Department of Mechanical Engineering, Faculty of Electrical Engineering, Budapest Technical University

EFFECT OF CAPSULATION DESIGN ON THE WARMING UP OF CAPSULATED ELECTRIC DEVICES

Budapest ELEKTROTECHNIKA in Hungarian Vol 69 No 6, Jun 76 pp 201-210 manuscript received May 75

[Abstract] Studies were carried out to establish the effects of geometric design, capsulating material, surface coating of the housing, and degree of closure of capsulated electric devices on the warming-up of the device. The tests reported were carried out on a Type 25 A motor-protecting unit made for the purposes of the project in a variety of versions.Increasing capsule size and openness of the design reduced heating-up, and the effects of the capsulating material depended on the degree of its thermal conductivity. Surface coating exerts its effect through heat radiation; degree of closure through the amount of ventilation it permits. Figures 8; tables 5; references 4: all Hungarian. 1/1

USSR UDC 681.846.73

YURASOV, V. S., candidate of technical sciences and BONDARENKO, A. I., engineer

OUTPUT DEVICE FOR SYSTEMS TO CONTROL THE RATE OF MOTION OF A MAGNETIC CARRIER

Kiev MEKHANIZATSIYA I AVTOMATIZATSIYA UPRAVLENIYA in Russian, No. 3(87), May-Jun 76 pp 60-62 manuscript received 29 Oct 75

[Abstract] The authors of this article describe an output device of systems for controlling the rate of motion of a magnetic carrier and give recommendations for selecting the parameters of its elements. This device is used in a system of automatic regulation of the speed of rotation of an electric motor operating on direct current with an indirect drive for the drive shaft of the tape-moving mechanism of the magnetic recording apparatus, as a result of which a high degree of stability is obtained in the rate of motion of the magnetic carrier. Figure 1.

1/1

USSR UDC 621.315.2.016.2:621.317.333.4

PLATONOV, VASILIY VASIL'YEVICH, and SHAL'IT, GERMAN MIKHAYLOVICH

TESTING AND BURNTHROUGH OF THE INSULATION OF POWER CABLE LINES

Moscow ISPYTANIYE I PROZHIGANIYE IZOLYATSII SILOVYKH KABEL'NYKH LINIY in Russian, "Energiya," 1975 136 pp

[Extracts] This book presents problems of testing and burnout of insulation. Methods and norms for testing of insulation of power cable lines, devices for testing and burnout of insulation of cables are analyzed. The book is designed for engineering and technical personnel of power systems and industrial enterprises involved in the operation of repair of cable lines. It may be useful to workers in planning-design and scientific-research organizations which utilize or develop devices for the testing or burnthrough of defective cable line insulation.

CONTENTS PAGE

Chapter I.	Testing of Cable Line Insulation	7
Chapter II.	Principles of the Process of Burnthrough of Oil-Paper Insulation	20

1/2

USSR

PLATONOV, VASILIY VASIL'YEVICH, and SHAL'IT, GERMAN MIKHAYLOVICH, ISPYTANIYE I PROZHIGANIYE IZOLYATSII SILOVYKH KABEL'NYKH LINIY, "Energiya," 1975 136 pp

Chapter III.	Burnthrough of DC Insulation	24
Chapter IV.	Burnthrough of AC Insulation	46
Chapter V.	Device for Burnthrough of Defective Insulation	61
Chapter VI.	Mobile Testing and Burnthrough Installations	87
Chapter VII.	Burnthrough Modes	107
Chapter VIII.	Analysis of Burnthrough Methods	116

2/2

USSR UDC 621.315.687.2.004

BRANZBURG, YE.Z., BERMAN. V.I., BELOTSERKOVETS, V.V., ZAKHAROV,A.P., KRYLOVA, F.I., and NAMESTNIKOVA, O.A., engineers, All-Union Scientific-Research Institute of the Cable Industry.

CABLES FOR TERMINATION OF CABLES AT A VOLTAGE UP TO 10kV FOR DAMP LOCATIONS

ENERGETIK in Russian No 8 Aug 76, pp 18-19

[Abstract] The paper is concerned with the development of a reliable design of a cable terminal for internal installation, especially for damp and extra damp locations. Comparative tests concerned with a number of factors were made under conditions close to operational of the principal forms of end connections in use. Subsequently, a new Mark KVE_p cable terminal was developed and subjected to tests conforming to those given the other cable terminals. In 1972-1973 a test introduction of the KVE_p was carried out on the active cable lines of Mosenergo [Moscow Regional Administration Of Power System Management], Lenenergo, and the Rizhskiy electrical networks, where the KVE_p units have been in operation up to the present. Figures 1; tables 1.
1/1

USSR UDC 537.318.62

GLUSHCHUK, N. I., DMITRIYEV, V. M. and ONISHCHENKO, V. V.

PARAMETRIC EFFECTS IN THIN SUPERCONDUCTIVE FILMS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76
pp 1707-1714 manuscript received 24 Jun 75

[Abstract] A feasibility study is done on using superconductive films as nonlinear elements in parametric devices, and specifically in regenerative converter amplifiers. Impedance modulation of superconductive films in rf fields is analyzed, and pumping conditions that give parametric amplification are determined. It is shown that the region of parametric amplification for a regenerative converter amplifier has a lower frequency limit $\omega > \omega_{cr}$ and an upper frequency limit $\omega \ll (k/\hbar)(T_c - T)$ that is determined by the adiabatic condition. The gain is calculated for a two-tank regenerative parametric converter amplifier. The authors thank G. Ye. Churilov for helpful discussions and V. N. Svetlov for assistance during fulfillment of the work. Figures 6; tables 1; references 7: 3 Russian, 4 Western.

1/1

USSR UDC 621.306.62.029.65

DIVIN, YU. YA., ZHUKOV, A. I., NAD', F. YA., RULEV, K. A. and TURYGIN, S. YU.

A DETECTOR RECEIVER OF MILLIMETER AND SUBMILLIMETER EMISSION BASED ON A SUPERCONDUCTIVE POINT CONTACT

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 8, Aug 76
pp 1702-1706 manuscript received 16 Jun 75

[Abstract] The paper describes a receiver for the millimeter and submillimeter wave bands based on the detecting properties of a superconductive point contact. A helium cryostat is used to hold the temperature at 4.2 K. The metal cryostat is shielded by a duralumin jacket surounded by two permalloy shields. Modulated emission is fed to the detector head by a stainless steel light guide 30 mm in diameter with a tapered tip to 9 mm. A mechanical device at the input of the light guide modulates the emission at 400 Hz. Losses amount to 3 dB in the 1.5-2 mm wave band. The electrodes in the detector head were made from niobium wire. The pointed electrode was made with a tip radius of about 5 μm or less, and the flat electrode was mechanically or chemically polished. Threshold sensitivity on a wavelength of 1.88 mm is $4 \cdot 10^{-14}$ W/Hz$^{1/2}$, which is much better than that of a similar detector based on InSb. The authors thank S. A. Andreyev, Ye. V. Antyukh, and G. F. Kalashnikov for assistance during preparation of the receiver. Figures 3; references 10: 6 Russian, 4 Western.
1/1

USSR

ARKHIPOV, PAVEL NIKOLAYEVICH

DESIGN AND MAINTENANCE OF THE "ELEKTRONIKA-DD" MACHINE

Moscow KONSTRUKTSIYA I TEKHNICHESKOYE OBSLUZHIVANIYE MASHINY "ELEKTRONIKA-DD" in Russian, "Statistika," 1975 136 pp

[Extracts] This book contains a description of the operating principle and design of the electronic and functional circuits of the "Elektronika-DD" machine. This text is designed for engineers, technicians, operators and mechanics involved in the operation, maintenance and repair of the "Elektronika-DD" domestic electronic key-actuated computer at computer centers, machine accounting stations, machine accounting offices, institutions and repair plants. The book may also be useful to students of computer technology.

CONTENTS PAGE

Chapter I. Purpose, Block Diagram and Operation of the "Elektronika" Keyboard Electronic Computer 4

1/2

USSR

ARKHIPOV, PAVEL NIKOLAYEVICH, KONSTRUKTSIYA I TEKHNICHESKOYE OBSLUZHIVANIYE MASHINY "ELEKTRONIKA-DD," "Statistika," 1975 136 pp

Chapter II. Design, Electrical Elements and Functional Circuits of the "Elektronika" Machine 21
Chapter III. Arithmetic and Logic Principles of the "Elektronika" machine 71
Chapter IV. Input of Information and Arithmetic Operations 80
Chapter V. Maintenance and Repair of the "Elektronika" Key-actuated Computer 116

2/2

USSR

ARKHIPOV, NIKOLAY GRIGOR'YEVICH, BOBOROV, ALEKSANDR GAVRILOVICH, and TARANENKO, VIKTOR KIRILLOVICH

DESIGN AND MAINTENANCE OF THE TAPE PERFORATOR OF THE "ZOEMTRON-383" ELECTRONIC COMPUTER

Moscow KONSTRUKTSIYA I TEKHNICHESKOYE OBSLUZHIVANIYE LENTOCHNOGO PERFORATORA EVM "ZOEMTRON-383" in Russian, "Statistika," 1975 152 pp

[Extracts] The "Zoemtron-383" electronic billing machine consists of the basic "Zoemtron-382" machine, combined with an S8021 tape perforator. The main type of work performed by this complex includes problems related to the output of digital information, characters and symbols onto perforated tape. The task of the present work is to aid students in technikums and educational combines of the GUPK [?State Personnel Training Administration] TsSU [Central Statistical Administration], USSR, students in Vuzes of the corresponding specialties as well as engineering and technical personnel of machine accounting bureaus, machine accounting stations and computer centers.

1/2

USSR

ARKHIPOV, NIKOLAY GRIGOR'YEVICH, BOBOROV, ALEKSANDR GAVRILOVICH, and TARANENKO, VIKTOR KIRILLOVICH, KONSTRUKTSIYA I TEKHNICHESKOYE OBSLUZHIVANIYE LENTOCHNOGO PERFORATORA EVM "ZOEMTRON-383," "Statistika," 1975 152 pp

CONTENTS PAGE

Chapter I.	General Information	4
Chapter II.	The Tape Perforator	17
Chapter III.	Elements of the Functional System of the Arithmetic Device and Synchronization Unit	35
Chapter IV.	Output of Coded Digital Information, Characters and Symbols Onto Perforated Tape	75
Chapter V.	Supplementary Devices	107
Chapter VI.	Principles of Program Control of the Operation of the Perforator	123
Chapter VII.	Maintenance	134

2/2

EAST GERMANY

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

THE BUS STRUCTURE OF THE PROCESSING NETWORKS IN SMALL COMPUTERS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 8, 76 pp 295-297
manuscript received 29 Sep 75

[Abstract] The author describes and compares the various ways in which the internal bus system is structured. Then, he derives typical application cases for the major structures of the bus system. The following subjects are covered: The 3-, 2-, and 1-bus systems; relationships between the data collection paths, the intermediate registers, and the processing time; and applications for the 3-, 2-, and 1-bus structures. The 3-bus system requires only a single beat for a combination operation without intermediate register; thus it is suitable for small and process computers where fast processing is required. Very few uses appear appropriate for the 2-bus system. The 1-bus system is simple and may find uses in simple flexible computers, where speed is not vital. Figures 7; table 1; references 16: 3 Western and 13 German.
1/1

USSR

KORYACHKO, V. P. [Reviewer]

MINICOMPUTERS. PRINCIPLES OF CONSTRUCTION AND DESIGN

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4(24), Jul/Aug 76 p 140

[Review of book "Mini-EVM. Printsipy Postroyeniya i Proyektirovaniya" by Aleksandr Vasil'yevich Palagin, candidate of technical sciences, Cybernetics Institute, Academy of Sciences, UkrSSR, V. A. Ivanov, A. F. Kurgayev and V. P. Denisenko, Kiev, "Naukova Dumka," 1975, 200 pp2

[Abstract] The monograph is the first Soviet book to give a systematic exposition of the fundamentals of minicomputer design. Basic systems requirements are considered, the influence of hardware on computer structure is examined, and the evolution of minicomputer development is discussed. The particulars of organizing command and address systems are analyzed. Algorithmic, program and microprogram levels of control are described, and an engineering technique is proposed for design of microprogram automata. The authors also give their own ideas on software for handling

control of technological processes and on problem-oriented program software. The use of LSI circuitry in minicomputer design is not considered, but may be the topic of a separate book.

POLAND

MOLISZ, WOJCIECH, Institute of Telecommunication, Gdansk Polytechnic

OPTIMIZATION OF MESSAGE ROUTING IN COMPUTER NETWORK WITH A MINIMUM AVERAGE DELAY TIME

Warsaw ARCHIWUM AUTOMATYKI I TELEMECHANIKI in Polish Vol 21, No 2, 1976 pp 193-207 manuscript received 3 Jul 75

[Abstract] The solution of the optimization of the message routing problem was attempted by assuming 1) the mutual independence of Poisson information flows in the channels; 2) the exponential distribution of message lengths; 3) the independence of arrival processes at different computer nodes; 4) the independence of service time at successive nodes; and that the average delay of one bit flowing from a source to a terminal was related to the average flows in the channels. Consequently, the optimal control problem was conceived as that of finding routes for average flows while minimizing the average delay and satisfying the known flow requirements. Under the above assumptions the optimization may be considered as a nonlinear multi-commodity flow problem. An algorithm is presented and difficulties connected with the necessary computer storage capacity are discussed. A numerical example has been computed on an ICL System 4-70 computer. Figures 1; tables 1; references 5: 3 Polish, 2 Western.
1/1

EAST GERMANY

THOMAS, JUERGEN, graduate engineer, Institute of Communication Technology, East Berlin

NEW SYMBOLS FOR THE REPRESENTATION OF LOGICALBINARY COMPONENTS

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 18, Sep 76 pp 595-598

[Abstract] This article describes the symbol system for binary components specified in the new East-German Standard 16,056/01 to 16,056/06. The standard covers the principle of the symbol system, the dimensions of the symbols, the function indicators, the inputs and outputs, logical connection members, triggers, combination components, and special components. All symbols are square or rectangular; there are no circles, half circles, and the like. One of the reasons for promulgating the new symbol system was to facilitate computer-aided documentation preparation. The new symbols are mandatory in documentation in international operations from 1977 onward; they become mandatory in domestic operations from 1978 onward. The symbols are illustrated. Figures 14; tables 2; references 6: all to East-German standards.
1/1

USSR UDC 539.216.2

AVAYEVA, I.G., LISOVSKIY, F.V., OSIKA, V.A., and SHCHEGLOV, V.I.

FERROMAGNETIC RESONANCE IN EPITAXIAL MIXED FERRITE-GARNET FILMS

Moscow RADIOTEKHNIKA I ELEKTRONIKA in Russian Vol 21, No 9, 1976, pp 1894-1900 manuscript received 21 Jul 75

[Abstract] In connection with the increase of work on the use of cylindrical magnetic domains (CMD) in computing technology, an investigation of the magnetic parameters of materials with CMD is of interest. From the point of view of CMD-applications, the most promising are epitaxial mixed ferrite-garnet films. The present paper is concerned with an experimental investigation of the ferromagnetic resonance properties of such films at a frequency of approximately 9500 MHz in fields up to 5000 oersted. The angular dependences were calculated of the resonance fields in such films and a comparison made of theoretical conclusions and experimental results. The effect was investigated of residual cubic anistropy and magnetostrictive stress on the resonance properties of the films. A procedure is discussed and the results are presented of measurements of the constant of uniaxial anistropy, saturation magnetization, the constant of magnetostriction and the damping parameter. Figures 8; tables 1, references 10: 3 Russian; 7 Western.

1/1

USSR UDC 65.015.11

TYUTIN, ANATOLIY ALEKSEYEVICH, candidate of technical sciences, Cybernetics Institute, Academy of Sciences, UkrSSR (Kiyev); RUSTAMOV, IGOR' ANVEROVICH, graduate student, Cybernetics Institute, Academy of Sciences, UkrSSR (Kiyev); and RESHET'KO, ALEKSANDR IVANOVICH, engineer, Cybernetics Institute, Academy of Sciences (Kiyev)

INFORMATION-ENGINEERING PROVISIONS OF AN AUTOMATED SYSTEM FOR PRINTED CIRCUIT BOARD DESIGN

Kiyev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3(23) May-June 76, pp 66-72 manuscript received 15 Jan 76

[Abstract] The paper describes the structure and function of the individual devices, the organization of information storage and processing, the language means of interaction of the user with the system, and some other peculiarities of a system of automated design of multilayer printed circuit boards and hybrid integrated circuits with regular packaging of circuit components, developed at the Cybernetics Institute of the Academy of Sciences, UkrSSR. The principal characteristics are presented of the application program package designed by the authors for a BESM-6 (operational

1/2

USSR

TYUTIN, ANATOLIY ALEKSEYEVICH et al, Kiyev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY No 3(23) May-June 76, pp 66-72

system DUBNA) electronic computer. Block diagrams are shown of the information-engineering structure of the system of automated design, and the engineering scheme of the automated design of printed circuit boards. The design directives (37 in number) are shown in a table. Figures 2; tables 1, references 3 Russian.

2/2

HUNGARY UDC 62-525:66:681.3:62-501

Mrs BACSO, NANDOR, and MARTON, JOZSEF, Dr, MTA SZTAKI [Computer Technology and Automation Research Institute, Hungarian Academy of Sciences, and HAMPEL, ANTAL, MIKI [Instrument Industry Research Institute]

DATA ACQUISITION SYSTEM USED BY THE CHEMICAL INDUSTRY FOR ELECTRICAL AND PNEUMATIC SIGNALS

Budapest MERES ES AUTOMATIKA in Hungarian Vol 24 No 5, 76 pp 158-161 manuscript received 8 Sep 76

[Abstract] The system consists of the MULTIDUCER 32 unit, a 32-channel device with pneumatic channel selector and pneumatic-to-electrical converter (developed at the Pneumatics Department of the SZTAKI for the Cybernetics Institute of Cuba), described in this journal (No 4, 1974), operated in conjunction with the MINIDATA test-data acquisition system, developed at the MIKI. The MINIDATA system is a modular device containing analog signal-source interfaces, test-location selectors, analog-to-digital converters, digital signal processing units, and peripheral devices. It may be operated with microprocessor or programmable tabletop computer. The combined system may be used in various applications. Figures 5; references 4: 1 Hungarian and 3 Western.
1/1

USSR UDC 621.3.004:621.382.82.001.4

BUROVTSEV, VYACHESLAV AFANAS'YEVICH, engineer, Special Design Office of Scientific Instrument Construction, Siberian Department, Academy of Sciences, USSR.; IBRAGIMOV, KAMIL SHAYKHULLOVICH, teacher, Kishinev Polytechnical Institute imeni S. Lazo; and PODZIN, ALEKSEY YEGOROVICH, candidate of technical sciences, Special Design Office of Scientific Instrument Construction, Siberian Department, Academy of Sciences, USSR.

SYSTEM OF HARDWARE-FUNCTIONAL CHECKING AND DIAGNOSTICS OF DIGITAL CIRCUITS, CONTROLLED BY SMALL COMPUTER

Kiyev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3(23) May-June 76, pp 44-48 manuscript received 2 Apr 75; after completion, 29 Dec 75

[Abstract] The paper considers problems of organization, design structures and the mathematical means of a system of checking and diagnostics of digital units, developed on the basis of the small "Elektronika-100" electronic computer. A block diagram is shown of the system of checking and diagnostics developed and realized in the Special Design Office of Scientific Instrument
1/2

USSR

BUROVTSEV, VYACHESLAV AFANAS'YEVICH et al, Kiyev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY No 3(23) May-June 76, pp 44-48

Construction, Siberian Department, Academy of Sciences, USSR. The peculiarities of a specialized language of the dialogue type used to describe algorithms of checking and diagnostics of various types of digital circuits are presented. The principal characteristics of the system are: 1) Number of information outputs of checking unit--up to 84; 2) Levels of output signals of system--corresponds to signal levels of elements of series 155; 3) Average time of checking of circuit containing up to 20 IC, series 155--5 sec; 4) Translator memory capacity--2.5 K; 5) Program of checking and diagnostics (symbols)--2500. A test of the system during the course of a year showed its high efficiency. Figures 1; references 6 Russian.

2/2

USSR UDC 621.318:681.327.2

RAYEV, V. K., candidate of technical sciences, POTAPOV, V. S. and SHOTOV, A. YE., engineers

ON THE STORAGE OF INFORMATION IN MEMORIES ON CYLINDRICAL MAGNETIC DOMAINS DURING SUPPLY SHUT-OFF AND ON

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 pp 12-15

[Abstract] The authors of this article are concerned with the storage of information in cylindrical magnetic domain (CMD) memories. They describe the characteristic types of breakdowns in CMD memories and the causes of them. They give an example of a simultaneous switching of the control coils to a sinusoidal-shaped voltage source and the commutation of the control coils with a one-quarter period shift. The describe the case of a pulsed supply and the output circuits of the block for controlling the field. They discuss the influence of an additional plane-parallel field and state that in certain instances when it is necessary to clean the memory of external parasite magnetic fields, an effective way may be transferring the working volume of the memory into an additional magnetic screen. Figures 4; references 6: 2 Russian, 4 Western.
1/1

USSR UDC 621.375.826

KUTSENKO, ANDREY VARFOLOMEYEVICH, candidate of technical sciences, Physics Institute imeni P.N.Lebedev, Academy of Sciences, USSR (Moscow); POLOS'YANTS, BORIS ARTEMOVICH, engineer, Physics Institute imeni P.N. Lebedev, Academy of Sciences, USSR; and TEREKHIN, STANISLAV AL'BERTOVICH, engineer, Physics Institute imeni P.N. Lebedev, Academy of Sciences, USSR.

MINI-ELECTRONIC COMPUTER IN EXPERIMENTS IN LASER LOCATION OF MOON

Kiyev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3(23) May-June 76, pp 86-90 manuscript received 9 Dec 75

[Abstract] Early in 1973 a complex for laser location of the moon was mounted on the 2.6-meter Shayn reflecting telescope of the Crimean Astrophysical Observatory. An automation system based on a mini-electronic computer was introduced into this complex in June 1973, after which regular sessions for location of the lunar reflectors began. Later on, the complex underwent some evolution making it possible to increase the precision of measurements as well as the efficiency and convenience of the work. As a whole the complex is an involved installation, consisting of a laser transmitter, a photodetector, a telescope with an aiming system,
1/2

USSR

KUTSENKO, ANDREY VARFOLOMEYEVICH et al Kiyev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY No 3(23) May-June 76, pp 86-90

receiving-measuring apparatus and an automotive system based on a mini-electronic computer. The present paper discusses problems and peculiarities of the minicomputer application in the experiments on laser location of the moon. The methods, hardware and software of a developed automated system are described. The principle of accumulation of the reflected signal under conditions of change of the distance between the earth and moon is illustrated, and a block diagram is presented of the complex for laser location of the moon. Figures 3; references 3 Russian.

2/2

USSR UDC 681.325.54/56

GURARIY, MARK MOISEYEVICH, engineer, Scientific-Research Institute of Coal Industry Control (Mosciw) and RUSAKOV, SERGEY GRIGOR'YEVICH, candidate of technical sciences, Moscow Institute of Electronic Machinary (Moscow)

A METHOD OF OPTIMUM CALCULATION OF THE PARAMETERS OF LARGE-SCALE INTEGRATED CIRCUITS WITH HIERARCHICAL REPRESENTATION OF THEIR MATHEMATICAL MODELS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 4(24), Jul/Aug 76 pp 115-119 manuscript received 20 Oct 75; after completion, 10 Mar 76

[Russian abstract provided by the source]

[Text] Methods are proposed for machine calculation and optimization of the electrical characteristics of LSI circuitry that reduce computing costs by autonomous organization of computing processes for separate subcircuits. The methods are applicable to calculation of systems of different physical types. Figures 1; references 9 Russian.

1/1

USSR

UDC 681.327.22:535.8

GOLOVANEVSKIY, E. I., doctor of technical sciences and STOROZHENKO, A. V., engineer

ELECTRO-OPTICAL SYSTEMS OF EXTRACTING INFORMATION FROM A COMPUTER IN GRAPHIC FORM

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian, No 7, 1976 pp 11-12

[Abstract] The authors of this article discuss the advantages of using an electro-optical system for discrete deflection of a laser beam for displaying information from a computer onto a screen in graphic form as compared with the analogous use of cathode ray tubes. They give the experimental results and photographs of the curves computed on the computer and shown on the screen using a system of discrete deflection. Figures 2; references 6: 6 Russian.

1/1

USSR

UDC 681.332.3; 681.332.6

KORABLEV, I. V. and AMANNAZAROV, A., All-Union Correspondence Institute of Light Industry and the Textile Industry

ANALYSIS OF ERRORS OF MEASUREMENT CIRCUITS IN MAGNETO-OPTICAL ANALYZERS

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 8, 1976 pp 92-98 manuscript received 6 Mar 74

[Russian abstract provided by the source]

[Text] The authors calculate the mean square errors of the principal measurement circuits of magneto-optical analyzers that are caused by instability of circuit parameters and additive interference. The optimum parameters of magneto-optical analyzers are determined that minimize measurement errors, and the accuracies of the investigated analyzers are compared. Figures 1; references 9: 8 Russian, 1 Western.

1/1

USSR UDC 681.332.3: 681.335.7

KASHTANOV, YU. V. and UGRYUMOV, YE. P., Leningrad Electrical Engineering Institute imeni V. I. Ul'yanov (Lenin)

AN INTERFERENCE-RESISTANT INTEGRATOR WITH LONG-TERM ACTION

Leningrad IZVESTIYA VUZov, PRIBOROSTROYENIYE in Russian Vol 19, No 8, 1976 pp 54-58 manuscript received 30 May 75

[Abstract] An integrating circuit with long-term action is described in which the integrator is a digital counter. A converter changes the analog input signal to a pulse train with recurrence rate proportional to the signal information parameter. The integration result (counter code) controls a code-to-voltage converter with DC voltage output fed to one of the inputs of a threshold comparison circuit and simultaneously through a normally closed switch to the input of an analog memory cell. The output of this cell is connected to the other input of the threshold comparison circuit. The threshold voltage corresponds to one or two units of the least significant place of the converter code. If the counter fails when the code differs from the preceding value by an amount sufficient to operate the threshold comparison circuit, the information is recovered when the normally closed switch

1/2

USSR

KASHTANOV, YU. V. and UGRYUMOV, YE. P., IZVESTIYA VUZov, PRIBOROSTROYENIYE, Vol 19, No 8, 1976 pp 54-58

opens, connecting a high-frequency pulse generator through logic circuits to the counter input. As a result a rapid linear change in the counter code takes place until the difference between the output voltages of the memory cell and the code-to-voltage converter is again less than the threshold value, at which point the logic circuits return the integrator to the normal working mode. Expressions are derived for choosing the parameters of the elements of the integrating circuit. Figures 2; references 2 Russian.

2/2

EAST GERMANY

[Unattributed article]

TELEVISION TUNER WITH DIGITAL TUNING AND TRANSMITTER MEMORY

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 25 No 18, Sep 76
pp 591-592

[Abstract] A digital television tuner is described and illustrated with circuit and block diagram. It tunes digitally, taking the tuning voltage from a memory and converting it into analog form for the tuning diode. It permits electronic storage of transmitter settings, maintains the storage content even with the set turned off, permits pushbutton selection and digital display of the tuned channel, is capable of being adapted to various tuners with tuning diodes, input keyboards, display systems, and remote control systems, is capable of being adapted to various television standards (channel distribution) and cable television, is simple to operate, is compatible with channel and time display on the picture screen, and is economical to manufacture. The unit is not yet being manufactured; only a laboratory prototype has been built so far. Figures 2; reference 1: Western.
1/1

EAST GERMANY

HAASE, C., Central Laboratory for Radio and Television Reception Technology, Dresden

THE LINE EFFECT IN MATRIX DISPLAY SYSTEMS

East Berlin NACHRICHTENTECHNIK ELEKTRONIK in German Vol 26 No 8, 76 pp 291-294
manuscript received 19 Sep 75

[Abstract] The line effect, which is predicated on the finite conductivity of the electrodes and the capacitive effect of the various luminous components in flat, matrix-type display systems, leads to very high brightness decrease, especially in high-resolution (such as TV-resolution) systems of usual screen sizes. Among the methods discussed for reducing this effect, the most suitable is the use of strongly non-linear luminous components or by the series-connection of nonlinear capacities or resistors in the form of thin layers. Electrode-control time extension, which assumes a system with pulse-length modulation, is another potential approach. Figures 8; references 5: 3 German and 2 Western.
1/1

CSO: 1860

- END -