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CLASS 713, ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: SUPPORT

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SECTION I - CLASS DEFINITION

GENERAL STATEMENT OF THE CLASS SUBJECT MATTER

This class provides, within a computer or digital data processing system, for the following subject matter:

(A) Processes or apparatus for establishing original operating parameters or data for a computer or digital data processing system, such as, allocating extended or expanded memory, specifying device drivers, paths, files, buffers, disk management, etc.;

(B) Processes or apparatus for changing system settings or operational modes in a computer or digital data processing system after they have been set;

(C) Processes or apparatus for increasing a system's extension of protection of system hardware,software, or data frm maliciously caused destruction, unauthorized modification, or unauthorized disclosure;

(D) Processes or apparatus for modifying or responding to the available power to a computer or digital data processing system or programmable calculator;

(E) Processes or apparatus for synchronization of two or more processors;

(F) Processes or apparatus wherein a clock or timing signals, timing pulses, or data associated with the control or regulation of any one or combination of processing components, memory components, and peripheral components are caused to operate in synchronization;

(G) Processes or apparatus for generation, division, or distribution of clock signals, pulse signals, or timing signals in a computer or digital data processing system from one or more sources into groups of continuous and successive time increments, and including event timing and counting, and the correction of the clock signals, pulse signals, or timing signals;

(H) Processes or apparatus wherein there is a significant temporal, incremental or sequencing control provided to one or more computers, digital data processing systems, processors, memory, or peripherals, or to data transmission between these systems or components;

SCOPE OF THE CLASS

(1) Note. Together, a portion of the class directed to Database and File Management or Data Structures, and a series of Electrical Computers and Data Processing classes are the generic classes for electrical computers and digital data processing systems and corresponding data processing processes including processes and apparatus for controlling operations of computers and digital data processing system. See the SEE OR SEARCH CLASS note below.

(2) Note. Process and apparatus for facilitating or supporting the operation of processing, storing, and inputting/outputting in a computer or digital data processing system are classified herein.

(3) Note. Process and apparatus used for installation of software or version management of an executable program for a computer or digital data processing system are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

(4) Note. The species of computer support directed to reliability and availability, fault recovery, or failure or error detection is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

(5) Note. Process and apparatus for developing, managing, translating or compiling instruction data for a computer or digital data processing system are classified elsewhere. See the SEE SEARCH CLASS notes below.

(6) Note. Process and apparatus for analyzing or debugging instruction data for a computer or digital data processing system are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

(7) Note. Process and apparatus used for managing or controlling of process, task, or job execution for a computer or digital data processing system are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

(8) Note. Process and apparatus for exchanging data or messages between executing processes in a computer or digital data processing system are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

SECTION II - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

235,	Registers, various subclasses for basic machines and associated indicating mechanisms for ascertaining the number of movements of various devices and machines, plus machines made from these basic machines alone (e.g., cash registers, voting machines), and in combination with various perfecting features, such as printers and recording means, and also for various data bearing record controlled systems.
326,	Electronic Digital Logic Circuitry, subclass **30** for bus or line terminating circuitry, subclasses 62 - 92 for generic digital logic, gate level interface circuitry, and subclasses 93 - 98 for clocking or synchronization of logic stages or gates.
327,	Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses **141** through **163**for synchronizing electrical nonlinear devices, and particularly subclasses 142 - 143 for miscellaneous synchronizing reset circuits which may be power supply responsive.
340,	Communications: Electrical, subclasses **825** through **825.98**for controlling one or more devices to obtain a plurality of results by transmission of a designated one of plural distinctive control signals over a smaller number of communication lines or channels, particularly subclasses 2.1-2.8 for path selection; subclasses 3.1-3.9 for communication systems where status of a controlled device is communicated, particularly subclass 3.51 for selective communication address polling control; subclasses 5.1-5.92 for security by intelligence comparison (e.g., authorization, etc.) in a selective communication system; subclass 825.02 for tree or cascade selective communication; subclasses 825.2-825.21 for synchronizing selective communication systems; subclasses 825.5-825.51 for lockout or priority in a selective communication system; subclasses 825.52 and 825.53 for addressing in selective system; and subclasses 825.57-825.69 for pulse responsive actuation in selective system.
345,	Computer Graphics Processing and Selective Visual Display Systems, subclasses **1.1** through **3.4**for visual display systems with selective electrical control including display memory organization and structure for storing image data and manipulating image data between a display,

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memory and display peripheral; subclasses 156-184 for display peripheral interface input device; subclasses 204-215 for display driving control circuitry; subclasses 418-475 for computer graphics processing; and subclasses 501-522 for computer graphic processing systems.

348, Television, subclass **5.5** for use or access blocking, subclasses 500 -551 for synchronization.

358, Facsimile and Static Presentation Processing, subclass **400** – 304 (facsimile) for transmitting data from a facsimile machine peripheral to a computer (e.g., by modem) for transmission over a telephone line to another computer (e.g., by modem) for transmission to another facsimile machine peripheral, subclasses 409-424 for synchronization in a facsimile system, and subclasses 500-540 for natural color facsimile.

360, Dynamic Magnetic Information Storage or Retrieval, for record carriers and systems wherein data are stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer, for example, magnetic disk drive devices and control thereof, per se, appropriate subclasses.

361, Electricity: Electrical Systems and Devices, subclasses **1** through **138**for safety and protection of systems and devices, and subclasses 236 - 244 for electrical speed signal processing system.

365, Static Information Storage and Retrieval, appropriate subclasses for addressable static singular storage elements or plural singular storage elements of the same type (i.e., the internal elements of memory, per se), particularly subclasses **226** through **229**for powering including conservation of power and prevention of loss of stored information due to power interruption.

369, Dynamic Information Storage or Retrieval, appropriate subclasses for record carriers and systems wherein data are stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer.

370, Multiplex Communications, for the simultaneous transmission of two or more signals over a common medium, particularly subclasses **351** through **430**for path finding or routing including packet switching, circuit switching, ATM switching, subclasses 254 - 258 for network configuration determination, subclasses 324, 350, 503 - 520 for synchronization over freespace or wire, and subclasses 465 - 473 for adaptive communication protocol.

375, Pulse or Digital Communications, appropriate subclasses for generic pulse or digital communication systems and synchronization of clocking signals from input data, particularly subclass **354** – 376 for synchronizing the operation of the receiving and transmitting mechanism including synchronization fault prevention and self synchronization.

377, Electrical Pulse Counters, Pulse Dividers, and Shift Registers: Circuits and Systems, appropriate subclasses for generic circuits for pulse counting, particularly subclass **32** for preventing inaccurate count due to power supply failure, subclasses 78 - 79 for phase clocking or synchronizing in a shift register operation, subclass 80 for parallel clocking, subclasses 104 - 105 for phased clocking.

379, Telephonic Communications, appropriate subclasses for two-way electrical communication of intelligible audio data of arbitrary content over a link including an electrical conductor, particularly subclass **145** for fraud or interference prevention, subclasses 188 -200 for telephone call or terminal access alarm or control (e.g., access blocking equipment), subclasses 322 - 324 for a power supply in a centralized switching system, subclasses 413 – 413.01 for a power supply in a subscriber line or transmission line interface.

380, Cryptography, appropriate subclasses and particularly subclass **287** for electric signal modification.

381, Electrical Audio Signal Processing Systems and Devices, appropriate subclasses for wired one-way audio systems, per se.

382, Image Analysis, appropriate subclasses for operations performed on image data with the aim of measuring a characteristic of an image, detecting variations, detecting structures, or transforming the image data, and for procedures for analyzing and categorizing patterns present in image data.

388, Electricity: Motor Control Systems, cross-reference art collection 907.5 for computer or processor control of motor acceleration or speed.

455, Telecommunications, appropriate subclasses for modulated carrier wave communication, per se, and particularly subclass **26.1** for subject matter which blocks access to a signal source or otherwise limits usage of modulated carrier equipment.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses **1** through **89**for generic data processing control systems and subclasses 90-306 for specific applications.

701, Data Processing: Vehicles, Navigation, and Relative Location, subclasses **1** through **124**for vehicle control, guidance, operation, or indication, subclasses 200 -226 for navigation, and subclasses 300 -302 for relative location determination.

702, Data Processing: Measuring, Calibrating, or Testing, appropriate subclasses, particularly subclasses **60** through **63**for power parameter measuring system, subclass 125 for timing signal generation in a testing system, subclasses 176 -178 for time duration or rate measuring system, and subclass 186 for computer and peripheral benchmarking.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, appropriate subclasses.

704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/ Decompression, subclasses **1** through **10**for linguistics; subclasses 200 -278 for speech processing, and subclasses 500 - 504 for audio signal time or bandwidth compression or expansion.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **18** for a point of sale terminal or an electronic cash register having security or user identification, subclass 44 for authentication or authorization in a credit or loan processing system.

706, Data Processing: Artificial Intelligence, subclasses **1** through **9**for fuzzy logic hardware; subclass10 for plural processing intelligence systems, subclass 11 for artificial intelligence system having particular user interface; subclasses 12 -13 for machine learning system, subclass 14 for adaptive system; subclasses 15 -44 for neural network; and subclasses 45 -61 for knowledge processing system.

707, Data Processing: Database and File Management or Data Structures, particularly subclasses **1** through **10**for database or file accessing, subclasses 100-104.1 for database scheme or structure, and subclasses 200-206 for file or database management.

708, Electrical Computers: Arithmetic Processing and Calculating, appropriate subclasses for specialized function or calculation operation performed by an electrical analog computer, an electric hybrid computer, or an electric digital calculating computer.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, appropriate subclasses for transferring data between a plurality of computers even if the transferring employs peripherals (e.g., modems, line adapters, etc.).

710, Electrical Computers and Digital Processing Systems, Input/Output, appropriate subclasses for interconnecting or transferring data among processors, memories, and peripherals of computers or digital data processing systems.

711, Electrical Computers and Digital Processing Systems: Memory, subclasses **1** through **6**for addressing combined with specific memory configurations (e.g., extended, expanded, dynamic, etc.) in a computer, subclasses 100 -173 for accessing or controlling memories that are peripherals, for caching data, particularly subclass 164 for access limiting with password or key; and subclasses 200 -221 for generalized address forming in a computer.

712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), appropriate subclasses for processing architectures including virtual processors; multiple-instruction-multiple-data (MIMD); vector and array processors; single-chip microprocessors; and for fetching, buffering, decoding, or executing instruction data for operations other than I/O (e.g., logic functions).

714, Error Detection/Correction and Fault Detection/Recovery, particularly subclass **707** for synchronization control using an error rate; subclass 731 for a reference timing function or a clock pulse generator in a scan path testing system; subclass 744 for clock or synchronization in digital logic testing using a test pattern generator; subclass 798 for error detection for synchronization control.

715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses **500** through **542**for document presentation processing, and subclasses 700-866 for computer operator interface.

716, Data Processing: Design and Analysis of Circuit or Semiconductor Mask, appropriate subclasses.

717, Data Processing: Software Development, Installation, and Management, subclasses **100** through **167**for software program development tools including systems and functions to develop, manage, translate, or compile instruction data, to analyze or debug instruction data, subclasses 168-

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173 for software upgrading or updating of an operating system, application program or other executable program; and subclasses 174 – 178 for software installation of an operating system, application program or other executable program.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclassesfor administering over processor or job execution in a digital data processing system.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclassesfor exchanging data or messages between two executing programs or processes, independent of the hardware used in the communication.

SECTION III - GLOSSARY

APPLICATION PROGRAM

A computer program designed to perform a certain type of work, such as an application to manipulate text, numbers, graphics or a combination of these elements. An application differs from an operating system (which runs a computer), a utility (which performs maintenance or general-purpose chores), and a language (with which computer programs are created).

BOOT

To start up a computer or the process of starting or resetting a computer.

BUS

A conductor used for transferring data, signals, or power.

COMPUTER

A machine that inputs data, processes data, stores data, and outputs data.

DATA

Representation of information in a coded manner suitable for communication, interpretation, or processing.

Address data - Data that represent or identify a source or destination.

Instruction data - Data that represent an operation and identify its operands, if any.

Status data - Data that represent conditions of data, computers, peripherals, memory, etc.

User data - Data other than address data, instruction data, or status data.

DATA PROCESSING

See PROCESSING, below.

DIGITAL DATA PROCESSING SYSTEM

An arrangement of processor(s) in combination with either memory or peripherals, or both, performing data processing.

ERROR

Manifestation of a fault as an undesired event that occurs when actual behavior deviates from the behavior that is required by initial specifications.

FAILURE

Manifestation of an error as a nonperformance of an expected system service as required by the initial specifications.

FAULT

A flaw in a functional unit (hardware or software).

INFORMATION

Meaning that a human being assigns to data by means of the conventions applied to that data.

MEMORY

A functional unit to which data can be stored and from which data can be retrieved.

OPERATING SYSTEM

Software responsible for controlling the allocation and usage of hardware resources such as memory, central processing unit (CPU) time, disk space, and peripheral devices. The operating system is the foundation on which application programs are built.

PERIPHERAL

A functional unit that transmits data to or receives data from a computer to which it is coupled.

PROCESSING

Methods or apparatus performing systematic operations upon data or information exemplified by functions such as data or information transferring, merging, sorting, and calculating (i.e., arithmetic operations or logical operations).

(1) Note. In this class, the glossary term data is used to modify processing in the term data processing; whereas the term digital data processing system refers to a machine performing data processing.

(2) Note. In an effort to avoid redundant constructions, in this class, where appropriate, the term address data processing is used in place of address data data processing.

PROCESSOR

A functional unit that interprets and executes instruction data.

PROGRAM

A sequence of instructions that can be executed by a computer. The term can refer to the original source code or to the executable (machine language) version.

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RECOVERY

Responding to a fault in a system by either returning a system to a previous level of correct operation, achieving a degraded level of correct operation, or safely shutting down the system.

SECURITY

Extent of protection for system hardware, software, or data from maliciously caused destruction, unauthorized modification, or unauthorized disclosure.

SUBCLASSES

1 **DIGITAL DATA PROCESSING SYSTEM INITIALIZATION OR CONFIGURATION (E.G., INITIALIZING, SETUP, CONFIGURATION, OR RESETTING):**
This subclass is indented under the class definition. Subject matter comprising means or steps for establishing an original operating parameter or data for a computer or digital data processing system.

(1) Note. The means or steps for establishing the original operating parameter or data may be related to, for example, extended or expanded memory, device driver, path, file, buffer, disk management, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2, for loading initialization program (e.g., booting, rebooting, warm booting, remote booting, BIOS, initial program load (IPL) or bootstrapping).

100, for reconfiguring of system settings, per se.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclasses 825+ for selective communication systems.

370, Multiplex Communications, subclasses 254+ for network configuration determination.

707, Data Processing: Database and File Management, Data Structures, or Document Processing, subclasses 200+ for file system handling.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclasses 220+ for network computer configuring,particularly subclass 222 for initializing.

710, Electrical Computers and Digital Processing Systems: Input/Output, subclasses 8+ for peripheral configuration, subclasses 104+ for configuring under system intra connecting.

711, Electrical Computers and Digital Processing Systems, subclasses 170+ for memory configuring.

712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses 1+ for processor architectures.

714, Error Detection/Correction and Fault Detection /Recovery, subclasses 3+ for masking or reconfiguring in the event of a fault under fault recovery, reliability and availability, subclass 36 for testing at power up.

715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclass 866 for configuring an operator interface; cross-reference art collection 966 for computer process control or configuration in an operator interface.

2 **Loading initialization program (e.g., booting, rebooting, warm booting, remote booting, BIOS, initial program load (IPL), bootstrapping):**
This subclass is indented under subclass 1. Subject matter comprising means or steps for booting a computer or digital data processing system.

(1) Note. This subclass includes initial program load (IPL), bootstrap, re-booting/resetting, loading an updated BIOS, and warm/cold booting. These events typically occur automatically in the computer system at power on reset or after a warm boot or warm restart and include reading memory locations. Memory accessing and control, per se, and address formation, per se, however, are classified elsewhere.

(2) Note. For the purpose of this definition it should be understood that transferring an operating system into memory may involve the use of a secondary loader program.

SEE OR SEARCH CLASS:

711, Electrical Computers and Digital Processing Systems, subclasses 100+ for storage accessing and control, subclasses 170+ for memory space allocationor memo configuring, and subclasses 200+ for address formation.

714, Error Detection/Correction and Fault Detection/Recovery, subclass 36 for power-on self test (POST).

100 **RECONFIGURATION (E.G., CHANGING SYSTEM SETTING):**
This subclass is indented under the class definition. Subject matter comprising means or steps for changing a system setting or an operational mode after it has been set.

(1) Note. The subject matter of this subclass is directed to alteration of system settings, parameters, or operational modes that have been previously set or initialized. Initialization of a system is classified elsewhere.

(2) Note. For the purpose of this definition system settings" includes any system data orientation or device configuration required for a particular mode of operation of a digital data processing system.

(3) Note. The subject matter of this subclass is directed to alteration of system settings, parameters, or operational modes that have been previously set or initialized. Context switching of a processor, computer, or digital data processing system between executing processes, tasks, or threads is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1, for configuring of system settings, per se.

2, for initialization of a computer or a digital data processing system.

SEE OR SEARCH CLASS:

707, Data Processing: Database and File Management, Data Structures, or Document Processing, subclasses 200+ for file system handling.

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass 221 for network computer reconfiguring.

710, Electrical Computers and Digital Processing Systems: Input/Output, subclasses 8+ for peripheral configuration, subclass 104 for configuration under system intra connecting.

711, Electrical Computers and Digital Processing Systems: Memory, subclasses 170+ for memory space allocation or memory configuring.

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712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses **1**+ for processor architectures, subclass 229 for mode switching under processing control at the ALU level.

714, Error Detection/Correction and Fault Detection /Recovery, subclasses **3**+ for masking or reconfiguration in the event of a fault under fault recovery, reliability and availability, and subclass 36 for testing at power up.

715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclass **866** for operator interface configuring.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, subclasses **107** through **108**for multitasking and context switching under task management and control.

150 **MULTIPLE COMPUTER COMMUNICATION USING CRYPTOGRAPHY:**
Subject matter for cryptographically protecting the transfer of data among a plurality of spatially distributed (i.e., situated at different locations) computers or digital data processing systems via one or more communications media (e.g., computer networks) wherein the computers or digital data processing systems employ the data in data processing before or after the transferring, and wherein the transferring affects the data transfer between the computers.

(1) Note. Excluded herein is subject matter related to computer or data processing security having only nominal recitation of cryptographic processing such as encrypting, scrambling, etc. Such nominal recitation of cryptography combined with computer or data processing security is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

201, for computer network security in general or in combination with nominal cryptography.

SEE OR SEARCH CLASS:

380, Cryptography, art collections FOR 149 and FOR 150 for cryptographic igital signal handling which may include cryptographic computer communication.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, appropriate subclassesfor multiple computer data transferring absent cryptography, particularly subclasses 225 for controlled network access without cryptographic technique, 226 for network resource allocating without cryptographic technique, and subclass 229 for trusted authority authentication for access to network resources without cryptographic technique.

151 **Protection of a particular protocol layer:**
This subclass is indented under **150**. Subject matter wherein the protection of the data transfer occurs at a specified stack model level.

152 **Application layer security:**
This subclass is indented under **151**. Subject matter wherein protection occurs at the highest stack model level.

(1) Note. This includes security for data transfer applications such as e-mail or FTP.

153 **Particular node (e.g., gateway, bridge, router, etc.) for directing data and applying cryptography:**
This subclass is indented under **150**. Subject matter wherein cryptographic protection of data is effected by a distinct element directing the data transfer among the spatially distributed computers.

SEE OR SEARCH CLASS:

370, Multiplex Communications, subclasses **351** through **430**for multiplex communication routing absent cryptography.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **79** for cryptographic remote charge determination of a secure transaction including payment switch or gateway.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclasses **238** through **244**computer to computer data routing.

154 **Including filtering based on content or address:**
This subclass is indented under **153**. Subject matter wherein the distinct element screens the data for particular subject matter or network location designation.

155 **Central trusted authority provides computer authentication:**
This subclass is indented under **150**. Subject matter wherein a single source confirms the legitimacy of a computer on the network or provides logon authorization.

SEE OR SEARCH CLASS:

380, Cryptography, subclass **229** for video signal modification which is record or coin controlled and includes authentication, subclass 232 for video signal modification which has usage or charge determination including authentication, subclasses 247 - 250 for cellular phone cryptographic authentication, and subclass 258 for a communication system which is position dependent or has authentication.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **67** for secure transaction cryptographic processing (e.g., EFT/POS) including authentication.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, appropriate subclassesfor multiple computer data transferring absent cryptography, particularly subclasses 225 for controlled network access without cryptographic technique, 226 for network resource allocating without cryptographic technique, and subclass 229 for trusted authority authentication for access to network resources without cryptographic technique.

156 **By certificate:**
This subclass is indented under **155**. Subject matter wherein the single source provides digital information attesting to a network computers legitimacy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

175, for generation of a certificate.

157 **Chain or hierarchical certificates:**
This subclass is indented under **156**. Subject matter wherein a certificate references another certificate.

158 **Revocation or expiration:**
This subclass is indented under **156**. Subject matter wherein a single source provides information invalidating a previously issued certificate.

159 **Including intelligent token:**

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This subclass is indented under 155. Subject matter wherein the authentication includes a portable carrier with data processing capability.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172, 173, and 174 for generic authentication using intelligent token in multiple computer communication.

SEE OR SEARCH CLASS:

380, Cryptography, subclass **229** for authentication in a video system using a record or token.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses **65** through **69**for secure transaction including intelligent token.

160 **Packet header designating cryptographically protected data:**
This subclass is indented under 150. Subject matter wherein the data transfer uses an integral unit including information indicating that the associated data is encrypted or signed.

SEE OR SEARCH CLASS:

370, Multiplex Communications, subclasses **351** through **430**for pathfinding or routing in multiplexing systems.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclass **236** for computer to computer data framing.

161 **Data authentication:**
This subclass is indented under 160. Subject matter wherein the integral unit includes information to attest to the integrity of the data transferred.

SEE OR SEARCH THIS CLASS, SUBCLASS:

155+, for multiple computer communication using cryptography having central trusted authority providing computer authentication, and subclasses 168- 181 for multiple computer communication using cryptography having particular communication authentication technique.

SEE OR SEARCH CLASS:

380, Cryptography, subclass **229** for video signal modification which is record or coin controlled and includes authentication, subclass 232 for video signal modification which has usage or charge determination including authentication, subclasses 247-250 for cellular phone cryptographic authentication, and subclass 258 for a communication system which is position dependent or has authentication.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **67** for secure transaction cryptographic processing (e.g., EFT/POS) including authentication.

714, Electrical Computers and Digital Processing Systems: Error Detection/Correction and Fault Detection/Recovery, subclasses **746** -797 for digital data error correction and subclasses 799-824 for digital data error detection

162 **Having particular address related cryptography:**
This subclass is indented under 150. Subject matter including a specific network location designation associated with cryptographic protection.

SEE OR SEARCH CLASS:

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclass **245** for computer to computer data addressing.

163 **Multicast:**
This subclass is indented under 162. Subject matter wherein a group of users is selectively addressed.

164 **Security kernel or utility:**
This subclass is indented under 150. Subject matter wherein cryptographic protection of a computer network is provided by a portion of an operating system or a program dedicated to a specific system function.

SEE OR SEARCH CLASS:

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclassesfor computer task management and control.

165 **File protection:**
This subclass is indented under 164. Subject matter wherein the kernel or utility implements a file security system.

166 **Security levels:**
This subclass is indented under 164. Subject matter wherein the kernel or utility controls access to distinct tiers of system protection.

167 **Object protection:**
This subclass is indented under 164. Subject matter wherein the kernel or utility provides protection of or access to an integrated structure of data and routines is provided.

168 **Particular communication authentication technique:**
This subclass is indented under 150. Subject matter wherein the data processing before or after the transferring provides indication of a genuine transmission or reception of information or related entity.

SEE OR SEARCH THIS CLASS, SUBCLASS:

155, and 156-159 for multiple computer communication using cryptography having central trusted authority providing computer authentication, and subclass 161 for multiple computer communication using cryptography where packet header denotes cryptographically protected data and having data authentication

SEE OR SEARCH CLASS:

380, Cryptography, subclass **229** for video signal modification which is record or coin controlled and includes authentication, subclass 232 for video signal modification which has usage or charge determination including authentication, subclasses 247-250 for cellular phone cryptographic authentication, and subclass 258 for a communication system which is position dependent or has authentication.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **67** for secure transaction cryptographic processing (e.g., EFT/POS) including authentication.

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169 **Mutual entity authentication:**
This subclass is indented under 168. Subject matter wherein both a transmission and reception entity are determined to be genuine by each other.

170 **Authentication of an entity and a message:**
This subclass is indented under 168. Subject matter wherein a transmission or reception entity and a corresponding message are determined to be genuine.

171 **Having key exchange:**
This subclass is indented under 168. Subject matter wherein the transmission and reception entities exchange information during authentication which establishes an operational key.

SEE OR SEARCH CLASS:

380, Cryptography, subclasses 47 -227 for generic key management.

172 **Intelligent token:**
This subclass is indented under 168. Subject matter wherein a transmission or reception entity is a portable carrier with data processing capability.

SEE OR SEARCH CLASS:

380, Cryptography, subclasses 227 -230 for video electric signal modification using an intelligent token at the receiver.
705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses 65 through 69for secure transaction using intelligent token.

173 **Pre-loaded with certificate:**
This subclass is indented under 172. Subject matter wherein the portable carrier stores information attesting to the authenticity of a variable or parameter involved in the authentication.

SEE OR SEARCH CLASS:

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass 66 for secure transaction intelligent token initializing.

174 **Including particular multiplication or exponentiation circuit:**
This subclass is indented under 172. Subject matter including a circuit performing the arithmetic operation of multiplying two numbers together or raising a number to a particular power.

SEE OR SEARCH CLASS:

708, Electrical Computers: Arithmetic Processing and Calculating, subclass 606 for digital calculation of exponents and 620 for generic digital calculation of multiplication.

175 **By generation of certificate:**
This subclass is indented under 168. Subject matter wherein digital information attesting to the legitimacy of a transmission or reception is produced.

SEE OR SEARCH THIS CLASS, SUBCLASS:

156, 157, and 158 for computer network certificates.

176 **Authentication by digital signature representation or digital watermark:**
This subclass is indented under 168. Subject matter wherein a data object is cryptographically processed to produce a unique identifier which subsequently verifies the data object.

SEE OR SEARCH CLASS:

283, Printed Matter, subclass 13 for printed matter with watermark for concealing information.
382, Image Analysis, subclasses 276 through 308for image transformation.
705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass 75 for cryptographic secure transaction having transaction verification.

177 **Signature tree:**
This subclass is indented under 176. Subject matter wherein the cryptographic processing produces a combined time sequenced verifiable record of plural related data objects.

178 **Time stamp:**
This subclass is indented under 176. Subject matter wherein a time identifier is included in the verifiable record.

179 **Includes generation of associated coded record:**
This subclass is indented under 176. Subject matter wherein a machine readable indicia is produced which is representative of the data object.

SEE OR SEARCH CLASS:

380, Cryptography, subclass 246 for cryptographic facsimile having coded record generation.

180 **Generating specific digital signature type (e.g., blind, shared, or undeniable):**
This subclass is indented under 168. Subject matter including a particular type of processing for the production of the indication of a genuine transmission or reception of information or related entity.

(1) Note. This includes undeniable, blinded or shared signatures.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172, 173, and 174 for cryptographic multiple computer communication authentication by intelligent token.

SEE OR SEARCH CLASS:

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705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass 69 for cryptographic secure transaction having electronic cash detail.

181 **Message digest travels with message:**
This subclass is indented under 168. Subject matter wherein a value for verifying the integrity of the information transmitted is conveyed with the information.

SEE OR SEARCH CLASS:

714, Electrical Computers and Digital Processing Systems: Error Detection/Correction and Fault Detection/Recovery, subclasses 746 through 797for digital data error correction and subclasses 799-824 for digital data error detection.

182 **SYSTEM ACCESS CONTROL BASED ON USER IDENTIFICATION BY CRYPTOGRAPHY:**
Subject matter wherein authorization to a digital processing system is dependent upon cryptographically processed data for personal verification.

(1) Note. Excluded herein is subject matter related to computer or data processing security having only nominal recitation of cryptographic processing such as encrypting, scrambling, etc. Such nominal recitation of cryptography combined with computer or data processing security is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

155+, for computer authentication in cryptographic multiple computer communication.
200+, for computer security in general or in combination with nominal cryptography.

SEE OR SEARCH CLASS:

379, Telephonic Communications, subclasses 93.02+ for access restriction to a computer system over a telephone line absent encryption.
708, Electrical Computers: Arithmetic Processing and Calculating, subclass 135 for particular security input to digital calculating computer absent encryption.

183 **Solely password entry (no record or token):**
This subclass is indented under 182. Subject matter wherein the identification is dependent upon the submission exclusively of a password by the user.

SEE OR SEARCH THIS CLASS, SUBCLASS:

202, for computer password security absent cryptography.

SEE OR SEARCH CLASS:

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass 72 for PIN verification in a secure transaction.

184 **PIN/password generator device:**
This subclass is indented under 182. Subject matter including a device which produces the personal identification number or the user password.

SEE OR SEARCH THIS CLASS, SUBCLASS:

202, for computer password security absent cryptography.

185 **Using record or token:**
This subclass is indented under 182. Subject matter wherein verification is determined in conjunction with a portable data carrier.

SEE OR SEARCH CLASS:

235, Registers, subclasses 380 through 382.5for identification system controlled by a data bearing record.
705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses 65 through 69for secure transaction including intelligent token

186 **Biometric acquisition:**
This subclass is indented under 185. Subject matter wherein the identification is provided by a measurement or sensing of some unique user physical characteristic.

SEE OR SEARCH CLASS:

382, Image Analysis, subclass 115 for image analysis for personal identification (biometrics).
902, Electronic Funds Transfer, subclass 3 for a cross reference art collection for biometric evaluation in electronic funds transfer.

187 **COMPUTER PROGRAM MODIFICATION DETECTION BY CRYPTOGRAPHY:**
Subject matter wherein a cryptographic technique is used to determine that a change has occurred to a particular computer program.

(1) Note. Excluded herein is subject matter related to computer or data processing security having only nominal recitation of cryptographic processing such as encrypting, scrambling, etc. Such nominal recitation of cryptography combined with computer or data processing security is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

200, 201, and 202 for computer and digital processing security in general or in combination with nominal cryptography.

SEE OR SEARCH CLASS:

714, Electrical Computers and Digital Processing Systems: Error Detection/Correction and Fault Detection/Recovery, subclass 38 for error analysis of computer software.

188 **COMPUTER VIRUS DETECTION BY CRYPTOGRAPHY:**
Subject matter which cryptographically determines the presence of a computer program designed to cause a system malfunction.

(1) Note. Excluded herein is subject matter related to computer or data processing security having only nominal recitation of cryptographic processing such as encrypting, scrambling, etc. Such nominal recitation of cryptography combined with computer or data processing security is classified elsewhere.

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SEE OR SEARCH THIS CLASS, SUBCLASS:

200, 201, and 202 for computer and digital processing security in general or in combination with nominal cryptography.

SEE OR SEARCH CLASS:

714, Electrical Computers and Digital Processing Systems: Error Detection/Correction and Fault Detection/Recovery, subclass **38** for error analysis of computer software.

189 **DATA PROCESSING PROTECTION USING CRYPTOGRAPHY:**
Subject matter wherein cryptography is used in the protection of the operation of a computer.

(1) Note. Excluded herein is subject matter related to computer or data processing security having only nominal recitation of cryptographic processing such as encrypting, scrambling, etc. Such nominal recitation of cryptography combined with computer or data processing security is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

200, 201, and 202 for computer and digital processing security in general or in combination with nominal cryptography.

190 **Computer instruction/address encryption:**
This subclass is indented under **189**. Subject matter wherein a step of program execution or a designated memory location is encrypted.

SEE OR SEARCH CLASS:

711, Electrical Computers and Digital Processing Systems: Memory, subclasses **163** through **164**for generic access control to digital processing system storage.

191 **Upgrade/install encryption:**
This subclass is indented under **189**. Subject matter wherein an encryption routine is enhanced or introduced.

SEE OR SEARCH CLASS:

717, Data Processing: Software Development, Installation, and Management, subclasses **168** through **173**for software upgrading or updating (including plural version management) and subclasses 174-178 for software installation.

192 **Having separate add-on board:**
This subclass is indented under **189**. Subject matter including a distinct expansion circuit board which provides cryptographic protection.

SEE OR SEARCH CLASS:

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses **101** through **103**for bus expansion which may include card insertion.

193 **By stored data protection:**
This subclass is indented under **189**. Subject matter wherein unauthorized access to information held in static memory elements is prevented.

SEE OR SEARCH THIS CLASS, SUBCLASS:

22, for electrical signal modification involving dynamic tape storage.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, or Systems, subclasses **545** and 546 for signal protection by miscellaneous nonlinear devices, circuits, or systems.

365, Static Information Storage or Retrieval, appropriate subclasses for static memory information storage and retrieval.

711, Electrical Computers and Digital Processing Systems: Memory, appropriate subclasses for memory of a digital processing system and particularly subclasses **163** and 164 for access control to digital processing system storage absent encryption.

194 **Tamper resistant:**
This subclass is indented under **189**. Subject matter wherein a physical barrier has been provided to protect a component providing cryptographic processing in a digital processing system.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass **922** for a cross reference art collection of tamper resistant smart cards.

200 **SECURITY:**
This subclass is indented under **the class definition**. Subject matter further including means or steps for increasing a system"s extension of protection of system hardware, software, or data from maliciously caused destruction, unauthorized modification, or unauthorized disclosure to or by an end user.

(1) Note. This class is for protection against unauthorized use by a user. Fault recovery and locating, and fault detecting in a digital data processing system that is maliciously caused (e.g., by a computer virus), or the result of other unauthorized access, is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

(2) Note. Means or steps to prevent incorrect memory access requests that are not a system end-user request are classified elsewhere. See the SEE OR SEARCH CLASS notes below.

(3) Note. Authorization control without significant data processing features is classified elsewhere. See the SEE OR SEARCH CLASS notes below.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclass **8** for digital logic circuits acting to disable or prevent access to stored data or designated integrated circuit structure.

340, Communications: Electrical, subclasses **5.2** through **5.74**for authorization con without significant data process features claimed, particularly subclasses 5.22 through 5.25 for programmable or code learning authorization control, and subclasses 5.8-5.80 for intelligence comparison for authentication.

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365, Static Information Storage And Retrieval, subclass **185.04** for floating gate memory device having ability for securing data signal from being erased from memory cells.

380, Cryptography, subclasses **3**+ for stored information access or copy prevention (e.g., software program protection or computer virus detection) in combination with data encryption; subclass 22 for electrical signal modification, such as scrambling, with magnetic record carrier (e.g., tape, drum); subclasses 23+ for electrical signal modification with user or record authentication; and subclasses 49+ for electrical signal modification with digital signal handling.

455, Telecommunications, subclass **410** for security or fraud prevention in a radio telephone system.

704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclass **273** for an application of speech processing in a security system.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **18** for security in an electronic cash register or point of sale terminal having password entry mode, subclass 44 for authorization or authentication in a credit transaction or loan processing system.

708, Electrical Computers: Arithmetic Processing And Calculating, subclass **135** for electrical digital calculating computer with specialized input for security.

710, Electrical Computers and Digital Processing System: Input/Output, subclasses **36**+ for regulating access of peripherals to computers or vice-versa, subclasses 107+ for regulating access of processors or memories to a bus, subclasses 200 through 244 for general purpose access regulating and arbitration.

711, Electrical Computers and Digital Processing Systems: Memory, subclass **150** for regulating access to shared memories, subclasses 163+ for preventing unauthorized memory access requests.

714, Error Detection/Correction and Fault Detection /Recovery, subclasses **1**+ for recovering from, locating, or detecting a system fault caused by malicious or unauthorized access (e.g., by virus).

201 **Computer network:**
This subclass is indented under **subclass 200**. Subject matter further including means or steps for providing system security at network level.

SEE OR SEARCH CLASS:

709, Electrical Computers and Data Processing Systems-Multiple Computer or process Coordinating, subclass **225** controlling which of plural computers may transfer data via a communications medium.

202 **Password:**
This subclass is indented under **subclass 200**. Subject matter further including means or steps for providing system security by employing checking or monitoring of information, such as authorization code data.

SEE OR SEARCH CLASS:

380, Cryptography, subclass **4** for stored digital data access or copy prevention in combination with data encryption; e.g., software program protection or computer virus detection in combination with data encryption.

455, Telecommunications, subclass **26.1** for subject matter which blocks access to a signal source or otherwise limits usage of modulated carrier equipment.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses **225** through **227**for data processing article handling system having identification code, and subclass 237 for an operator or payment initiated dispensing or vending data processing system having password or PIN authorization.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass **18** for security in an electronic cash register or point of sale terminal having password entry mode.

711, Electrical Computers and Digital Processing Systems: Memory, subclass **164** for memory access requiring authorization code information (e.g., password or key other than encryption key, etc.).

714, Error Detection/Correction and Fault Detection /Recovery, subclasses **763**+ for memory access block coding, and subclass 805 for storage accessing error/fault detection techniques.

300 **COMPUTER POWER CONTROL**
This subclass is indented under **the class definition**. Subject matter including details of steps or means for modifying an amount of power used by a digital data processing system or a system response to available power.

(1) This subclass includes power reduction, powering-up systems, powering-down systems, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

321, for power saving features in an electric digital calculating computer.

SEE OR SEARCH CLASS:

60, Power Plants, appropriate subclasses for power plant apparatus, per se.

307, Electrical Transmission or Interconnecting Systems, subclasses **11**+ for plural load circuit systems, subclasses 43+ for plural supply circuits or sources.

310, Electrical Generator or Motor Structure, appropriate subclasses.

322, Electricity, Single Generator System, subclasses **17**+ for automatic control of generator or control means, subclasses 40+ for power transmitting mechanism control.

323, Electricity: Power Supply or Regulation Systems, appropriate subclasses for power supply regulation in general.

324, Electricity Measuring and Testing, subclasses **74**+ for testing or calibrating of watt- hour meters, subclasses 76.11+ for measuring, testing or sensing electricity, per se.

365, Static Information Storage and Retrieval, subclasses **226**+ for powering in a static memory device.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses **286** through **298**for data processing application in electrical power generation or distribution.

702, Data Processing: Measuring, Calibrating or Testing, subclasses **60**+ for power parameter measuring.

714, Error Detection/Correction and Fault Detection /Recovery, appropriate subclasses for power supply related reliability and availability fault recovery and fault locating.

310 **By external command:**
This subclass is indented under **subclass 300**. Subject matter wherein modification of power in a digital data processing system is initiated by a signal from outside of the system.

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323, Electricity: Power Supply or Regulating Systems, subclasses **318**+ for power controlled in response to an operator input or an externally generated signal.

320 **Power conservation:**
This subclass is indented under **subclass 300**. Subject matter wherein means or steps are provided to reduce an amount of power consumed by the digital data processing system.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, And Systems, subclass **544** for power conservation in a specific source of supply or bias voltage.
365, Static Information Storage and Retrieval, subclass **227** for conservation of power in a static memory device.
455, Telecommunication, subclass **574** for power supply conservation in a radio telephone equipment.

321 **Programmable calculator with power saving feature:**
This subclass is indented under **subclass 320**. Subject matter wherein means or steps are provided to reduce an amount of power consumed by a programmable calculator.

SEE OR SEARCH THIS CLASS, SUBCLASS:

320, for power conservation in a digital data processing system.

SEE OR SEARCH CLASS:

708, Electrical Computers: Arithmetic Processing and Calculating, subclass **130** for programmable calculator per se.

322 **By clock speed control (e.g., clock on/off):**
Subject matter under subclass320 wherein power conservation is achieved by regulating system oscillator frequency.

SEE OR SEARCH THIS CLASS, SUBCLASS:

601, for control of generic systems and devices by inhibiting or stopping a clock.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses **113**+ for miscellaneous frequency control.
331, Oscillators, appropriate subclasses for oscillators, per se.
332, Modulators, subclasses **117**+ for a frequency modulator.

323 **Active/idle mode processing:**
This subclass is indented under **subclass 320**. Subject matter wherein power conservation is achieved by selectively removing or reducing power to all elements of the digital data processing system according to a predefined pattern (i.e., mode) which results in a temporary interruption of data processing.

(1) Note. There may be more than two modes in a given system.

(2) Note. Included here are sleep/resume, suspend/resume or standby systems.

(3) Note. Power is subsequently applied or increased to recommence normal processing.

324 **By shutdown of only part of system:**
This subclass is indented under **subclass 320**. Subject matter wherein power conservation is achieved by selectively turning power off to only a portion of the digital data processing system.

330 **Power sequencing:**
This subclass is indented under **subclass 320**. Subject matter involving an application or a removal of power to the data processing system by a pre-determined series of stages.

(1) Note. Also included here is subject matter involving power sequence inhibit.

340 **Having power source monitoring:**
This subclass is indented under **subclass 300**. Subject matter including sensing of some digital data processing system power parameter.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclasses **76.11**+ for measuring or testing of electricity, per se.
700, Data Processing: Generic Control Systems or Specific Applications, subclasses **286** through **298**for data processing application in electrical power generation or distribution.
702, Data Processing: Measuring, Calibrating or Testing, subclasses **60**+ for power parameter measuring.

375 **SYNCHRONIZATION OF PLURAL PROCESSORS:**
This subclass is indented under **the class definition**. Subject matter comprising means or steps for synchronizing the control or regulation of clocking or timing operations of two or more processors.

(1) Note. Classification herein is proper if a single clock or timing circuit controls the processors, plural clocks or timing circuits are synchronized to control the processors, or operations are synchronized to occur on the same clocking or timing cycle.

(2) Note. Passing of data (e.g., tokens, semaphores) for multicomputer synchronizing is classified elsewhere in this class. See the SEE OR SEARCH CLASS notes below.

SEE OR SEARCH CLASS:

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, subclass **248** for multicomputer synchronization.

400 **SYNCHRONIZATION OF CLOCK OR TIMING SIGNALS, DATA, OR PULSES**
This subclass is indented under **the class definition**. Subject matter wherein clock or timing signals, timing pulses, or data associated with a control or regulation of processing component, memory component, or I/O component are caused to operate in synchronization.

SEE OR SEARCH THIS CLASS, SUBCLASS:

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500, for clock, pulse or timing signal generation or analysis in a digital data processing system.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclasses **93**+ for clocking or synchronizing of logic states or gates.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, appropriate subclasses, particularly subclasses **141**+ for synchronizing in a signal converting, shaping or generating system.

348, Television, appropriate subclasses, particularly subclasses **500**+ for techniques or maintain proper time or phase correspondence between scanning components of the television system.

358, Facsimile and Static Presentation Processing, subclasses **409** through **424**for methods or apparatus to maintain a proper time or phase correspondence between a transmitter and a receiver of a facsimile system.

368, Horology: Time Measuring Systems or Devices, subclasses **47** and 52+ for synchronization in plural timepiece system or system device.

370, Multiplex Communications, subclass **324** for multiple access time division synchronization in an airborne or space satellite repeater, subclass 350 for synchronization in a combining or distributing information via time channels of a communication over free space system and subclasses 503+ for synchronization in a combining or distributing information via time channels of a communication over wire system.

375, Pulse or Digital Communications, subclasses **354**+ for synchronizing the operation of pulse or digital receiving or transmitting mechanisms.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses **7**+ for operations research per se including systems directed to generalized linear programming problem solving and cost function analysis, resource allocating in business transaction processing and scheduling of interrelated processes.

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclass **248** for multi-computer synchronization in a network.

710, Electrical Computers and Digital Processing Systems: Input/Output, subclass **61** for synchronous data transfer in I/O process timing.

712, Electrical Computers and Digital Processing Systems-Processing Architectures and Instruction Processing (e.g., Processors), subclasses **220**+ for processing control, per se; and particularly subclasses 245+ for processing sequence control.

714, Error Detection/Correction Fault Detection /Recovery, subclass **12** for synchronization maintenance of concurrent redundantly operating processors in a fault recovery by masking or reconfiguring; subclasess15+ for state recovery (i.e., process or data file) in computers or digital data processing systems, subclass 707 for a data error detection/correction system in which a determination of an error rate is used to control synchronization between devices, subclass 731 for a scan path digital logic testing system having a timing function or a clock pulse generator, subclass 744 for a digital logic testing system having a timing function or a clock pulse generator; subclass 775 for the detection and correction of a lack of synchronization between an encoder and a decoder used in a forward error correction by block code system, subclass 789 for the detection/correction of a lack of synchronization between an encoder and a decoder in a forward error correction by tree code system, subclass 798 for error detection techniques utilized to detect an out-of-synch condition or to control synchronization between devices.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for task management or control, particularly subclasses **102** through **108**for process scheduling.

401 **Using delay:**
This subclass is indented under **subclass 400**. Subject matter wherein the clock or timing signals, timing pulses, or data are delayed to provide synchronization.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclass **409** for circuits that include a delay for synchronization between logic stages in a nonlinear reactor.

318, Electricity: Motive Power Systems, subclasses **141**+ for automatic generator control with time delay and subclasses 445+ for motive power system with time delays, per se.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass **136** for particular delay or sync in a apparatus for generating sawtooth or triangle output, subclass 149 for multiple clocks feedback synchronizing apparatus having phase lock loop with variable delay means, subclasses 261+ for signal converting, shaping or generating having specific delay in producing output waveform, subclasses 392+ for delay controlled switch.

361, Electricity: Electrical Systems and Devices, subclasses **195**+ for time delay control circuits for relay or solenoid.

500 **CLOCK, PULSE, OR TIMING SIGNAL GENERATION OR ANALYSIS:**
This subclass is indented under **the class definition**. Subject matter including generation, division or distribution of a clock signal, pulse signal, or timing signal in the digital data processing system from one or more sources into a group of continuous and successive time increments; or including event timing and counting, or correction of a clock signal, pulse signal, or timing signal.

(1) Note. This subclass accepts signal generators producing several clock or timing signals, signal generators with changeable or programmable intervals, and generation of signals using a delay function or device. Particular components such as delay devices, per se, are classified elsewhere.

(2) Note. Mere nominal recitation of a computer or digital data processing system in combinations with a clock or timing generation circuit is not proper for this subclass. Timing generation circuits, per se, such as, oscillators, electrical pulse counters, pulse dividers, or shift register systems are classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

400, for synchronization of clock or timing signals, data, or pulses in a digital data processing system.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclasses **93**+ for clocking or synchronizing of logic stages or gates.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses **100**+ for signal converting, shaping, or generating, particularly subclass 164 for generating rectangular or pulse waveform having random characteristic, subclasses 165+ for regenerating or restoring rectangular or pulse waveform and subclasses 291+ for clock or pulse waveform generating.

331, Oscillators, appropriate subclasses for oscillator, per se.

368, Horology: Time Measuring Systems or Devices, appropriate subclasses.

375, Pulse or Digital Communications, appropriate subclasses.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, appropriate subclasses.

702, Data Processing: Measuring, Calibrating or Testing, subclasses **124**+ for signal generator or waveform shaping in a testing system,

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particularly subclass 125 for timing signal generator in a testing system.

501 **Multiple or variable intervals or frequencies:**
This subclass is indented under **subclass 500**. Subject matter including generation and selection of plural or variable timing intervals.

(1) Note. This subclass accepts selecting or programming a clock rate in a computer or digital data processing system. Setting system initial operating parameters through a booting process is classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1+, for computer system booting, per se.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclass **96** for application of two or more time related or periodic signals to field-effect transistor for clocking or synchronizing.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and System, subclass **152** for obtaining a single delayed clock from plural candidates, subclass 295 wherein multiple separate output waveforms are produced and appear at respective output terminals, subclass 296 wherein multiple clock waveforms are derived at circuit outputs from plural clock inputs, and subclass 298 wherein plural inputs are utilized to produce a single clock output.

502 **Counting, scheduling, or event timing:**
This subclass is indented under **subclass 500**. Subject matter wherein counting is performed, an event is timed, or operation is scheduled using a generated interval.

SEE OR SEARCH CLASS:

377, Electrical Pulse Counters, Pulse Binders, or Ship Registers: Circuits and Systems, appropriate subclasses.

702, Data Processing: Measuring, Calibrating, or Testing, subclasses **176**+ for data processing system for measuring time duration or rate.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses **55**+ for error detection or notification in timing using for example watchdog timer time-out; and subclass 815 wherein the time delay between events or data is detected to determine a predetermined forbidden condition.

503 **Correction for skew, phase, or rate:**
This subclass is indented under **subclass 500**. Subject matter wherein a timing interval is corrected for skew or phase, or a rate is corrected by adjustment or alignment.

(1) Note. This subclass accepts clock and timing interval skew, phase and rate correcting in digital data processing systems and computers. Recovery from a fault caused by a timing interval skew is classified elsewhere.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclass **96** for application of two or more time related or periodic signals to field-effect transistor for clocking or synchronizing.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and System, subclasses **156**+ wherein a circuit compares the phase of an output signal with a reference signal and converts any difference into a correction voltage that changes the phase of the output so it matches that of the reference or input signal; subclass 292 wherein clock accuracy is ensured by correction for anticipated or actual clock errors.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses **1**+ for reliability and availability, per se; subclass 700 for detection/correction of an error caused by the time delay between plural parallel bits forming a byte or data word.

600 **CLOCK CONTROL OF DATA PROCESSING SYSTEM, COMPONENT, OR DATA TRANSMISSION:**
This subclass is indented under **the class definition**. Subject matter wherein there is a significant temporal, incremental, or sequencing control provided to a digital data processing system, processor, memory or peripheral, or to data transmission between such systems or components.

(1) Note. This is a generic subclass for clock control of operations of digital data processing systems or components thereof and for timing and clock related control of movement of data between systems or components.

(2) Note. Nominally claimed clock control of apparatus external to this class in combination with apparatus under this subclass definition is classified in this subclass unless provided for in the appropriate external class.

(3) Note. Significantly claimed clock control of apparatus external to this class in combination with apparatus under this subclass definition, which perform data processing or transmission operations, is classified in the class appropriate to the external device unless specifically excluded therefrom.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclasses **825**+ for systems directed solely addressing and communication between signaling systems and signaling devices between a communication medium.

370, Multiplex Communications, appropriate subclasses for systems directed solely to multiplexing, particularly subclasses **235**+ for flow control of data through a network for data flow congestion prevention or control.

375, Pulse or Digital Communications, appropriate subclasses for pulse modulation, transmitters, receivers, and synchronizers.

601 **Inhibiting timing generator or component:**
This subclass is indented under **subclass 600**. Subject matter wherein a clock or interval generator or a component of the system is inhibited or stopped.

SEE OR SEARCH THIS CLASS, SUBCLASS:

322, for computer power conservation by clock speed control (e.g., clock on/off).

FOREIGN ART COLLECTIONS

Any foreign patents/nonpatent literature,which were reclassified, have been transferred directly to the art collection listed below. This art collection contains ONLY foreign documents/nonpatent literature. [Note: Parenthetical references in the titles refer to the abolished U.S. classifications from which these art collections were derived.]

FOR 123 **Having cryptographic user or record actuated authentication (380/23):**

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Foreign art collection under the class definition which encrypts a signal indicating proper authorization of an individual or validity of a record for operating a device.

FOR 125 **Computer (380/25):**
Foreign art collection under collection 123 which encrypts and transmits authorization for access to computing or data processing equipment.

FOR 400 **SYNCHRONIZATION OF PLURAL PROCESSORS:**
Foreign art collection under the class definition including subject matter wherein control or regulation of clocking or timing operations of two or more processors is synchronized.

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