CLASS 377, ELECTRICAL PULSE COUNTERS, PULSE DIVIDERS, OR SHIFT REGISTERS: CIRCUITS AND SYSTEMS

SECTION I - CLASS DEFINITION

This is the generic class for circuits or devices for making a count of electrical pulses; for circuits or devices for producing output pulses which are a fraction of the number of input pulses i.e., pulse dividers of for devices where information is stored in and serially transferred through a storage medium i.e., shift registers. Also included are pulse multipliers which make use of pulse dividing circuits.

(1)   Note. The pulse dividers classified in this class make use of circuits or devices having a gating or switching action. For frequency changers which do not use such elements, e.g., parametric frequency converters, harmonic generators, etc. see the search notes.

(2)   Note. In reference to counting electrical pulses it is not necessary that a display means be claimed in order for the subject matter to be classified in this class.

(3)   Note. Magnetic counters are classified here; however magnetic shift registers for static storage and retrieval of information are a specialized form of shift register which are excluded from this class. See References to Other Classes, below.

(4)   Note. Where shift register circuits are used to perform a memory or storage function and specific structure relating to such function is claimed, e.g., relating to a "read", "write", or "erase" function, the subject matter is classified elsewhere. See References to Other Classes, below.

(5)   Note. A single "flip-flop" or bistable device is excluded from this class even though it can be considered a divide-by-two circuit. Such subject matter is classified elsewhere. See References to Other Classes, below. Where a plurality of "flip-flops" are connected together in series the circuit comprises a dividing or counting chain and is classified in this class.

(6)   Note. The electrical pulses which are applied to a counter may originate as mechanical pulses and be subsequently converted to electrical pulses.

Also included are applications using counters i.e., systems or devices performing functions other than counting and where a counter is used to indicate something about the state or operating condition of the device or system.

Also included are counters, dividers, or shift registers used in circuit configurations which comprise more than a counter, per se, but where the configuration is not provided for in one of the existing Electrical Classes.

COMBINATIONS OF OTHER APPARATUS WHICH INCLUDE THE APPARATUS OF THIS CLASS

Applications of counters as mentioned in the class definition are classified here only if significant structure of the device or apparatus external to the counter is not claimed. Otherwise, classification is in the appropriate device or application class.

SECTION II - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

235,   Registers, especially subclasses 93 through 105 for mechanical registers or counters.

307,   Electrical Transmission or Interconnection Systems, subclass 424 for parametric frequency converters.

327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 114+ for miscellaneous pulse frequency modification (e.g., multiplication or division) which does not utilize the multiplying or dividing elements classified herein, subclasses 185+ for a single "flip-flop" or a miscellaneous bistable circuit which may be used in counting chains, and subclasses 365+ for miscellaneous gating circuits.

331,   Oscillators, subclasses 1+ for phase locked loop circuits which make extensive use of pulse dividing circuits.

340,   Communications: Electrical, subclasses 12.18 through 12.2 for counters used in selective circuits and subclass 12.21 for shift registers used in selective circuits.

341,   Coded Data Generation or Conversion, subclasses 50+ for data converters which may make use of pulse dividing and shift register circuits.

361,   Electricity: Electrical Systems and Devices, subclasses 168.1+ where the "flip-flop" uses relays.

363,   Electric Power Conversion Systems, subclasses 8, 9+, and 157+ for frequency conversion used in power applications.

365,   Static Information Storage and Retrieval, subclasses 1+ for magnetic bubble counters, subclasses 73+ and 78 for shift register circuits claimed as static stores, subclasses 80+ for magnetic shift registers, and subclass 236 for counting matrix rows to address the desired row or location in the memory matrix.

368,   Horology: Time Measuring Systems or Devices, subclasses 85+, 155+, and 217+ electronic digital timing circuits using pulse dividing means.

370,   Multiplex Communications, for multiplex systems which make extensive use of shift register circuits.

399,   Electrophotography, subclasses 75+ for machine operation of an electrophotographic device reproducing copies, particularly subclasses 79+ for accounting of copies produced.

700,   Data Processing: Generic Control Systems or Specific Applications, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

701,   Data Processing: Vehicles, Navigation, and Relative Location, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

704,   Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

705,   Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

706,   Data Processing: Artificial Intelligence, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

708,   Electrical Computers: Arithmetic Processing and Calculating, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

709,   Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

710,   Electrical Computers and Digital Processing Systems: Input/Output, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

711,   Electrical Computers and Digital Processing Systems: Memory, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

712,   Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

713,   Electrical Computers and Digital Processing Systems: Support, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

714,   Error Detection/Correction and Fault Detection/Recovery, appropriate subclasses for this subject matter which makes extensive use of pulse dividing and shift register circuits.

SUBCLASSES

1   **APPLICATIONS:**
This subclass is indented under the class definition. Subject matter s designed for or utilized in a particular art device.

  (1)   Note. For classification herein, there must be significant claim recitation of counting means or circuit. Where significant structure of the particular art device is claimed, classification is in the appropriate device class.

2   **Control:**
This subclass is indented under subclass 1. Subject matter used to control a machine, apparatus, or process.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

44,   for one counter controlling another counter.

SEE OR SEARCH CLASS:

318,   Electricity: Motive Power Systems, for electric motor servo control systems where significant structure of the servo control system is claimed.

700,   Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for data processing generic control systems.

3   Counting, on an object, areas having alternating physical properties (e.g., counting lines on grid, teeth on gear, windings on coil):

This subclass is indented under subclass 1. Subject matter comprising means to count, on an object, areas or lines having alternate physical properties.

SEE OR SEARCH CLASS:

356,   Optics: Measuring and Testing, subclass 242.1 for significant optical testing or measuring structure including means to count threads.

4   Betting on the outcome of an event; totalizers:

This subclass is indented under subclass 1. Subject matter where counters or registers are controlled to accumulate the totals involved in betting on the various possibilities involved in an event and/or to determine the odds involved in the payoff of the various possibilities.

SEE OR SEARCH CLASS:

463,   Amusement Devices: Games, for a game that includes an electrical pulse counter, divider, or shift register where significant structure or methodology of the game is recited, especially subclasses 16+ for a game of chance (which frequently includes wagering or totalizing), and subclasses 25+ for credit/debit monitoring or manipulation in a game, e.g., prize level, betting-pool amount, etc.

700,   Data Processing: Generic Control Systems or Specific Applications, subclasses 91 through 93 for data processing or computation, per se, for the purpose of analyzing, monitoring, or scoring a contest or game, which is not classifiable elsewhere.

705,   Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass 14.14 for a wagering system including data processing for a promotional wagering business system which reduces or eliminates the cost of a good or product as a prize to encourage trade.

5   Game or sport:

This subclass is indented under subclass 1. Subject matter designed for or utilized in the area of athletic events for entertainment.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

4,   for counters used in betting on the outcome of a event.

SEE OR SEARCH CLASS:

463,   Amusement Devices: Games, especially subclasses 1+ for a game that includes an electrical pulse counter, divider, or shift register where, significant structure or methodology of the game is recited.

473,   Games Using Tangible Projectile, for apparatus or means used in a game or sport which uses a tangible projectile, which game apparatus or means may include a counting means or circuit but significant structure of the game apparatus or means is recited.

700,   Data Processing: Generic Control Systems or Specific Applications, subclasses 91 through 93 for data processing or computation, per se, for the purpose of analyzing, monitoring, or scoring a contest or game, which is not classifiable elsewhere.

6   Counting animate or inanimate entities:

This subclass is indented under subclass 1. Subject matter for counting nonliving or living entities.

SEE OR SEARCH CLASS:
209, Classifying, Separating, and Assorting Solids, subclass 551 for structure to assorting solids which may include item counting.
221, Article Dispensing, subclasses 2+ for structure to article dispensing which may include counting.
222, Dispensing, subclasses 23+ for structure to dispensing which may include counting.
246, Railway Switches and Signals, subclasses 77+ and 247 for railway switching and signaling structure including means for counting railway cars.
250, Radiant Energy, subclass 221 for optical or prephotocell systems controlled by articles, persons, or animals.
399, Electrophotography, subclasses 75+ for machine operation of an electrophotographic device reproducing copies, particularly subclasses 79+ for accounting of copies produced.

7 Coins:
This subclass is indented under subclass 6. Subject matter where the entity is a coin.

SEE OR SEARCH CLASS:
453, Coin Handling, subclasses 30+ and 58+ for structure to coin handling which include counters.

8 Flat articles (e.g., sheet, bill, ticket):
This subclass is indented under subclass 6. Subject matter where the length and width of the entity is large compared to its thickness.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7, for counting coins.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 559.01+ for evaluation or detection of sheet-type articles which include photocell means.
399, Electrophotography, subclasses 79+ for accounting of reproduced copies (e.g., flat sheets) in an electrophotographic device.

9 Vehicles:
This subclass is indented under subclass 6. Subject matter where entity is a vehicle.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclasses 425.5+, 907+, and 933+ for electrical signaling means for controlling traffic or vehicles.

10 Field of view contains plural entities or entities scanned plural times (e.g., microscopic particles):
This subclass is indented under subclass 6. Subject matter where the field of view of a detector encompasses plural entities or where entities are scanned plural times.

SEE OR SEARCH CLASS:
324, Electricity: Measuring and Testing, for particle counting where significant details are recited in regard to handling or preparing the particles to be counted.
702, Data Processing: Measuring, Calibrating, or Testing, subclass 26 for chemical analysis particle count and subclass 29 for chemical analysis particle size determination.

11 Including particle size determination:
This subclass is indented under subclass 10. Subject matter including means for determining particle size.

SEE OR SEARCH CLASS:
356, Optics: Measuring and Testing, subclasses 39+ for blood analysis.
702, Data Processing: Measuring, Calibrating, or Testing, subclass 21 for cell count or shape or size analysis in a biological or biochemical application, subclass 26 for quantitative determination by particle count in a chemical analysis measuring system, and subclass 29 for particle size determination in a chemical analysis measuring system.

12   **Counting by detecting electrical impedance variations:**
This subclass is indented under subclass 10. Subject matter where the entities which are counted are detected by sensing the difference in their electrical impedances relative to the surroundings.

13   **Registering counts for different categories (e.g., accounting):**
This subclass is indented under subclass 1. Subject matter comprising means for making separate counts of different categories of things.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
11,   where the different categories are different particle size distributions.

14   **Where the different categories represent monetary amounts (e.g., wages, charges):**
This subclass is indented under subclass 13. Subject matter where the categories are amounts of money which are associated with different items.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
7,   for counting coins of the same size.

SEE OR SEARCH CLASS:
705,   Data Processing: Financial, Business Practice, Management, or Cost/price Determination, subclasses 30+ for an accounting system having significant data processing.

15   **Counting based on number of times machine or apparatus operates:**
This subclass is indented under subclass 1. Subject matter including means for determining the number of times a machine or apparatus operates.

16   **Determining machine or apparatus operating time or monitoring machine apparatus or operation:**
This subclass is indented under subclass 1. Subject matter comprising counting means for determining the time which a machine or apparatus operates or for identifying or measuring some parameter relative to the operation of a machine or apparatus.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
15,   for counting the number of times a machine or apparatus operates.
38,   for plug-in counters.

17   **Position determining:**
This subclass is indented under subclass 1. Subject matter including counting means utilized in determining the position of some entity or for setting the position of some entity.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
38,   for plug-in counters.
87,   for means for sensing the position of a number wheel in an electromechanical counter.

18   **Of flat flexible strip (e.g., tape):**
This subclass is indented under subclass 17. Subject matter where the entity is a flat flexible strip of material.

19   **Measuring or testing:**
This subclass is indented under subclass 1. Subject matter where pulses are counted in systems for determining the value of some parameter.

SEE OR SEARCH CLASS:
73,   Measuring and Testing, for measuring or testing various physical quantities where significant structure of the measuring of testing means is claimed.
324,   Electricity: Measuring and Testing, for measuring or testing electrical quantities where significant structure of the measuring or testing means is claimed.
356,   Optics: Measuring and Testing, for measuring or testing optical quantities where significant structure of the measuring or testing means is claimed.

20 **Time combined with measurement of another parameter:**
This subclass is indented under subclass 19. Subject matter where pulse are counted for measurement of time and for some other parameter.

SEE OR SEARCH CLASS:
368, Horology: Time Measuring Systems or Devices, for time measuring means, per se.
700, Data Processing: Generic Control Systems or Specific Applications, subclass 306 for a control system based on an elapsed time.
702, Data Processing: Measuring, Calibrating, or Testing, subclass 79 for measuring of a time-related parameter in an electrical signal parameter measurement system, and subclasses 176+ for time duration or rate measuring system.

21 **Fluid flow:**
This subclass is indented under subclass 19. Subject matter where the parameter is the rate of flow of a fluid.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclasses 861+ for means for measuring fluid flow where significant structure of the measuring means is claimed.
137, Fluid Handling, appropriate subclass for fluid flow which includes structure to fluid handling.

22 **Weight:**
This subclass is indented under subclass 19. Subject matter where the parameter is weight.

SEE OR SEARCH CLASS:
177, Weighing Scales, for means for measuring weight where significant structure of the measuring means is claimed.
700, Data Processing: Generic Control Systems or Specific Applications, subclass 305 for weight responsive control.
702, Data Processing: Measuring, Calibrating, or Testing, subclasses 173+ for a weight measuring system.

23 **Acceleration:**
This subclass is indented under subclass 19. Subject matter where the parameter is acceleration.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclasses 488+ for acceleration measuring means of the inertial type where significant structure of the measuring means is claimed.
324, Electricity: Measuring and Testing, subclass 162 for electrical accelerometers where significant structure of the measuring means is claimed.
700, Data Processing: Generic Control Systems or Specific Applications, subclass 303 for dimensional responsive control.
702, Data Processing: Measuring, Calibrating, or Testing, subclass 141 for an acceleration measuring system.

24 **Dimension:**
This subclass is indented under subclass 19. Subject matter where the parameter is measurement of a distance.

SEE OR SEARCH CLASS:
33, Geometrical Instruments, for means for measuring dimensions where significant structure of the measuring means is claimed.
700, Data Processing: Generic Control Systems or Specific Applications, subclass 303 for dimensional responsive control.
702, Data Processing: Measuring, Calibrating, or Testing, subclasses 155+ for a dimensional measuring system.

24.1 **Distance and powered vehicle (e.g., odometer):**
This subclass is indented under subclass 24. Subject matter including on electronic counter for measuring or using distance involving a powered vehicle.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclass 490 for speed measurement with distance registering means.

235,   Registers, subclass 95 for odometers of the mechanical type.

346,   Recorders, subclass 15 for recording fare register; subclass 33 for external recorder operating means.

368,   Horology: Time Measuring Systems or Devices, subclass 2, 5, and 6 for time measurement in speed checkers, engines, and vehicles, respectively.

700,   Data Processing: Generic Control Systems or Specific Applications, subclass 303 for dimensional responsive control system and subclass 304 for speed responsive control system.

702,   Data Processing: Measuring, Calibrating, or Testing, subclasses 142+ for a speed measuring system, subclasses 158+ for a linear distance or length measuring system, and subclasses 163+ for a rotary distance or length measuring system.

705,   Data Processing: Financial, Business Practice, Management, or Cost/price Determination, subclass 417 for a system employing data processing with a taximeter.

24.2   Distance and human activity (e.g., pedometer, nonpowered golf carts):
This subclass is indented under subclass 24. Subject matter including an electronic counter for measuring or using distance under the control of a form of human activity.

SEE OR SEARCH CLASS:

33,   Geometrical Instruments, subclass 3 for measuring or indicating means relating to footwear.

235,   Registers, subclass 105 for mechanical pedometers.

324,   Electricity: Measuring and Testing, subclass 71.1 for determining non-electric properties by measuring electric properties.

368,   Horology: Time Measuring Systems or Devices, appropriate subclasses for time-based circuit devices.

702,   Data Processing: Measuring, Calibrating, or Testing, subclasses 142+ for a speed measuring system, subclasses 158+ for a linear distance or length measuring system, and subclasses 163+ for a rotary distance or length measuring system.

25   Temperature:
This subclass is indented under subclass 19. Subject matter wherein counting pulses represents temperature.

SEE OR SEARCH CLASS:

374,   Thermal Measuring and Testing, subclasses 170+ for similar subject manner having significant temperature responsive structure.

700,   Data Processing: Generic Control Systems or Specific Applications, subclasses 276 through 278 for HVAC control, and subclasses 299-300 for a temperature responsive control system.

702,   Data Processing: Measuring, Calibrating, or Testing, subclasses 130+ for a temperature measuring system.

26   Including memory:
This subclass is indented under subclass 1. Subject matter associated with means for storing data.

SEE OR SEARCH CLASS:

365,   Static Information Storage and Retrieval, for electronic storage and retrieval of information, per se; subclasses 185.01+ for floating gate memory storage (e.g., flash memory).

27   SYSTEMS:
This subclass is indented under the class definition. Subject matter where the circuitry involved includes more than a counter or shift register, per se, but is not sufficient for classification with a particular art device.

28   Identifying or correcting improper counter operation (e.g., error checking, monitoring; preventing or correcting improper counter operation):
This subclass is indented under subclass 27. Subject matter comprising means for identifying an incorrect condition in the operation of the counter or in the result produced and/or correcting such condition; or means for preventing such condition from arising.

SEE OR SEARCH CLASS:
714,   Error Detection/Correction and Fault Detection/Recovery, subclasses 746+ for digital data error detection in general.

29   Testing or calibrating the counter:
This subclass is indented under subclass 28. Subject matter comprising means to determine and/or adjust some operating condition of a counter or shift register.

30   Preventing an inaccurate count as a result of an external condition:
This subclass is indented under subclass 28. Subject matter comprising means for preventing an incorrect count as a result of some condition outside of the counter itself.

SEE OR SEARCH THIS CLASS, SUBCLASS:
28,   for preventing or correcting improper counter operation.
29,   for testing, monitoring, or calibrating the counter, per se.

SEE OR SEARCH CLASS:
365,   Static Information Storage and Retrieval, subclass 222 for prevention of loss of stored information by replenishing or amplifying a decayed signal.
708,   Electrical Computers: Arithmetic Processing and Calculating, subclasses 530+ for error detection or correction in digital computer computational operations.

31   Automatic preset:
This subclass is indented under subclass 30. Subject matter where, as a result of the external condition, the counter is automatically set to some predetermined count.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 142+ for miscellaneous synchronizing reset circuits which may be power supply responsive.

32   Power failure:
This subclass is indented under subclass 30. Subject matter where the external condition is the power supply for the counter.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 142+ for miscellaneous synchronizing reset circuits which may be power supply responsive.
340,   Communications: Electrical, subclasses 635+ for indicating systems responsive to the condition of electrical apparatus.
365,   Static Information Storage and Retrieval, subclasses 226+ for preventing loss of stored information as a result of power interruption.
368,   Horology: Time Measuring Systems or Devices, subclass 66 for monitoring the power level of a timepiece.

33   Using particular code or particular counting sequence:
This subclass is indented under subclass 27. Subject matter characterized by the use of a code or of a counting sequence which has special significance.

SEE OR SEARCH CLASS:
341,   Coded Data Generation or Conversion, appropriate subclasses for code conversion, analog to or from digital code conversion, data transmitters, or data generation.
375,   Pulse or Digital Communications, subclasses 242+ for pulse code modulation used in communication systems.

34   Minimum change code (e.g., gray code):
This subclass is indented under subclass 33. Subject matter comprising a code in which only one bit in the code group changes when going from a code group representing a given number to a code group representing an adjacent number.

35   Excess three code:
This subclass is indented under subclass 33. Subject matter where the code for each number is the same as in binary coded decimal except 3

is added to each decimal before encoding it into binary.

36   Biquinary code:
This subclass is indented under subclass 33. wherein the numbers from 0 to 9 are divided into two groups and one position of the code is used to determine in which group a given number is, and a five position code is used to determine the number in the group.

37   Sequential readout of plural counters or sequential sampling of inputs to a counter:
This subclass is indented under subclass 27. Subject matter whereby input circuits to a counter are sampled in order, or whereby the outputs of plural counters are sampled in order.

SEE OR SEARCH CLASS:
340,   Communications: Electrical, subclasses 1.1 through 16.1 for selective systems, in general.
370,   Multiplex Communications, for multiplex systems in general.

38   Plug in counter:
This subclass is indented under subclass 27. Subject matter where the counter is designed to be temporarily attached to a machine or apparatus.

SEE OR SEARCH THIS CLASS, SUBCLASS:
15,   for counting the number of times a machine or apparatus operates.
16,   for using counters to monitor some specific parameter relative to a machine, apparatus, or operation, e.g., the time a machine or apparatus operates.

39   Comparing counts:
This subclass is indented under subclass 27. Subject matter including means whereby a signal is generated or controlled in dependence on the result of comparing a number representing one count with another number representing another count.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 1+ for miscellaneous discriminating, comparing, or selecting circuits.
340,   Communications: Electrical, subclass 146.2 for digital comparator systems, per se.
708,   Electrical Computers: Arithmetic Processing and Calculating, subclass 671 for comparison operations in digital computer arithmetic computations.

40   Nonsignificant zero elimination:
This subclass is indented under subclass 27. Subject matter comprising means for eliminating, from a numerical read out, zeros which have no significance in regard to the value of a number.

SEE OR SEARCH CLASS:
708,   Electrical Computers: Arithmetic Processing and Calculating, subclass 166 for zero suppression in electric digital calculators.

41   Complementing a count:
This subclass is indented under subclass 27. Subject matter including means for generating a number which is the difference between a given count and a count representing the capacity of the counter.

42   Converting input or output signal from or to an analogue signal:
This subclass is indented under subclass 27. Subject matter including means whereby pulses to the system are converted from an analogue signal or output pulses from the system are converted to an analogue signal.

SEE OR SEARCH CLASS:
341,   Coded Data Generation or Conversion, subclasses 126+ for analogue to digital or digital to analogue converters, per se.

43   Having phase shift:
This subclass is indented under subclass 27. Subject matter including two pulse trains which are shifted from one time relationship with each other to another time relationship.

SEE OR SEARCH CLASS:

327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 141+ and 231+ for miscellaneous circuits which may utilize phase shifting.

44   Counter-controlled counter:
This subclass is indented under subclass 27. Subject matter where one counter controls another counter.

(1)   Note.   Connecting counter stages in series to increase the count capacity does not constitute a system for classification in this subclass. Such circuits are classified in subclasses 57 through 130.

45   Including reversible counter:
This subclass is indented under subclass 27. Subject matter where in one mode successive pulses cause the counter to count upward and in another mode cause the counter to count downward.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

61+,   for direction control of signal information in charge transfer device counters and shift registers.

85,   for reversible electromechanical counters.

123,   125 and 126, for pulse counting or dividing chains, per se, in the form of reversible counters.

SEE OR SEARCH CLASS:

708,   Electrical Computers: Arithmetic Processing and Calculating, subclass 672 for incrementation or decrementation of pulse signals in digital computer systems.

46   Including ring counter:
This subclass is indented under subclass 27. Subject matter including counters whereby information is transmitted serially through a counter from input to output (one cycle) and then transferred back to the input stage where the cycle begins again.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

122,   124, and 126, for pulse counting or dividing chains, per se, in the form of ring counters.

47   Pulse multiplication or division:
This subclass is indented under subclass 27. Subject matter where the number of output pulses in some multiple or some fraction of the number of input pulses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

18+,   for pulse counting or dividing chains, per se.

SEE OR SEARCH CLASS:

327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 114+ for miscellaneous pulse frequency modification (e.g., multiplication or division) which does not utilize the multiplying or dividing elements classified herein.

48   Multiplication or division by a fraction:
This subclass is indented under subclass 47. Subject matter where the arithmetic function is multiplication or division by a fraction.

49   Counter includes circuit for performing an arithmetic function:
This subclass is indented under subclass 27. Subject matter where a counter includes a circuit for performing an arithmetic function.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

47+,   for pulse multiplication or division means.

SEE OR SEARCH CLASS:

708,   Electrical Computers: Arithmetic Processing and Calculating, subclasses 490+ for digital calculators which perform arithmetic operations.

50   Compensation for excess or shortage of pulses:
This subclass is indented under subclass 27. Subject matter comprising means for adding pulses which are missing and/or eliminating pulses which are extraneous.

SEE OR SEARCH THIS CLASS, SUBCLASS:
28,   for systems relating to improper counter operation.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 18+ for miscellaneous detecting of absent or present pulses.
714,   Error Detection/Correction and Fault Detection/Recovery, subclasses 746+ for digital data error detection in general.

51   Including structure for detection or indicating overflow condition:
This subclass is indented under subclass 27. Subject matter comprising means for sensing and/or indicating when the count in a counter has exceeded the capacity of the counter.

SEE OR SEARCH THIS CLASS, SUBCLASS:
50,   for systems for compensating for an excess or shortage of pulses.

52   With programmable counter (i.e., with variable base):
This subclass is indented under subclass 27. Subject matter including means for varying the modules or base of a counter.

SEE OR SEARCH THIS CLASS, SUBCLASS:
84,   for programmable electromechanical counters.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 261+ for an output waveform delay circuit which may utilize a programmable counting device.

368,   Horology: Time Measuring Systems or Devices, appropriate subclasses, for pulse counters which may be preset to determine time.

53   With photoelectric sensor:
This subclass is indented under subclass 27. Subject matter including means for sensing electromagnetic radiation in the visible, ultraviolet, or infrared range.

SEE OR SEARCH THIS CLASS, SUBCLASS:
102,   for counters of dividers, per se, using bistable electro-optical devices.

SEE OR SEARCH CLASS:
250,   Radiant Energy, subclasses 336.1+ for invisible radiant energy responsive signalling devices and subclasses 200+ for photocell controlled systems.
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 514+ for miscellaneous nonlinear circuits whose operation is dependent upon the external effect of light energy.

54   Using shift register:
This subclass is indented under subclass 27. Subject matter including a device in which information is stored in and serially tranferred through a storage medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
57,   for shift register circuits of the charge transfer device type, per se.
64,   for shift registers, per se.

SEE OR SEARCH CLASS:
365,   Static Information Storage and Retrieval, subclasses 78, 80+, and 240 for storage and retrieval systems which involve shift registers.

55   Particular input circuit:
This subclass is indented under subclass 27. Subject matter wherein the system is characterized by having an input circuit having special significance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

60, for particular input circuits in charge transfer device-type counters.

70, for particular input circuits in shift registers, per se.

86, for particular input circuits in electromechanical counters.

111, for particular input circuits for counters in general.

56 **Particular output circuit:**
This subclass is indented under subclass 27. Subject matter wherein the system is characterized by having an output circuit having special significance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

60, for particular output circuits in charge transfer device-type counters or shift registers.

75, for particular output circuits in shift registers, per se.

87, for particular output circuits in electromechanical counters.

114, for particular output circuits for counters in general.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 51+ for miscellaneous circuits combining signal amplitude discriminating, comparing, or selecting with a sensing amplifier.

57 **CHARGE TRANSFER DEVICE (E.G., ANALOGUE SHIFT REGISTER, CCD, BUCKET BRIGADE DEVICE):**
This subclass is indented under the class definition. Subject matter where the functional element of the counter of shift register is an electrostatic potential controlled semiconductor structure, whereby counting or shifting is achieved by the sequential transfer of localized charges through storage sites within or at the surface of the semiconductor body.

(1) Note. In some charge transfer devices, such as bucket brigade types as distinguished from CCD types, not all of the charges in the storage sites are transferred.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, including subclasses 215+, for charge transfer type active semiconductor devices, per se.

326, Electronic Digital Logic Circuitry, subclass 61 for electronic digital logic with a charge transfer device.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 263+, 271, 277, and 284 for miscellaneous delay circuits utilizing a charge transfer device.

333, Wave Transmission Lines and Networks, subclass 165 for frequency or time domain filters and delay lines utilizing charge transfer devices.

365, Static Information Storage and Retrieval, subclasses 185.01+ for floating gate memory storage (e.g., flash memory) and subclass 183 for static storage charge coupled devices.

58 **Compensating for or preventing signal charge deterioration:**
This subclass is indented under subclass 57. Subject matter including means for compensating for or preventing deterioration of the charge which is passed through the charge transfer device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

68, for compensating for or preventing signal deterioration in shift registers in general.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclasses 21+ for digital logic circuits including circuits for maintaining logic signal transmission integrity.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 379+ for miscellaneous gating circuits including signal transfer loss prevention.

365, Static Information Storage and Retrieval, subclass 222 for stored signal loss prevention by data refresh circuitry.

59 With feedback:
This subclass is indented under subclass 57. Subject matter including means for feeding part of the output signal of the charge transfer device back to the input.

(1) Note. See search notes under subclass 57.

60 Particular input or output means:
This subclass is indented under subclass 57. Subject matter wherein the charge transfer device is characterized by input or output means having special significance.

SEE OR SEARCH THIS CLASS, SUBCLASS:
55, for particular input circuits in counting systems and see also search notes thereunder.
56, for particular output circuits in counting systems and see also search notes thereunder.

61 Direction and/or path flow control (e.g., clocking or biasing, by charge splitting):
This subclass is indented under subclass 57. Subject matter for controlling the direction or path in which the charge moves through the charge transfer device.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69, for shift direction control in shift registers in general.

62 In charge-coupled device:
This subclass is indented under subclass 61. Subject matter where the localized charges which move through storage sites include substantially all the mobile charges at a storage site.

63 Charge-coupled device:
This subclass is indented under subclass 57. Subject matter where the localized charges which move through storage sites include substantially all the mobile charges at a storage site.

SEE OR SEARCH THIS CLASS, SUBCLASS:
62, Including circuitry for direction and/or path flow control in charge coupled devices.

SEE OR SEARCH CLASS:
365, Static Information Storage and Retrieval, subclasses 185.01+ for floating gate memory storage (e.g., flash memory) and subclass 183 for static storage circuits using charge coupled devices.

64 SHIFT REGISTER:
This subclass is indented under the class definition. Subject matter comprising an information storage device in which the information, in the form of electric pulses, is stored in and serially transferred through a storage medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
57+, for shift registers using charge transfer means.

SEE OR SEARCH CLASS:
365, Static Information Storage and Retrieval, subclass 78 for plural shift register memory devices, subclasses 80+ for magnetic shift register memory systems, subclass 189.12 for a shift register in a static memory system read/write circuit subclass 240 for sequencing memory locations in an addressing circuit using shift registers.

65 Using electromechanical relays:
This subclass is indented under subclass 64. Subject matter using mechanical switching devices which are electrically controlled.

66 Asynchronous:
This subclass is indented under subclass 64. Subject matter where each stage of a register triggers the succeeding stage without the need for timing pulses.

67   **Multirank (i.e., rows of storage units form a shift register):**
This subclass is indented under subclass 64. Subject matter comprising plural sets of stages where information can be synchronously shifted between these sets of stages.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
61,   for charge transfer multirank shift registers.

68   **Compensating for or preventing signal deterioration:**
This subclass is indented under subclass 64. Subject matter including means for compensating for or preventing deterioration of the signal which is passed through the shift register.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
58,   for compensating for or preventing signal charge deterioration in charge transfer devices.

69   **Shift direction control:**
This subclass is indented under subclass 64. Subject matter where means are included to control the direction in which information can be transferred through the register.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
45,   for counting systems including reversible counters.
61+,   for signal direction control in charge transfer device registers or counters.
85,   for reversible electromechanical counters.
123,   for pulse counting or dividing chains of the reversible counter type using only three electrode semiconductor-type bistable regenerative trigger circuits.
125,   for reversible counting or dividing chains using bistable regenerative trigger circuits in general.
126,   for reversible counting and dividing chains in general.

70   **Particular input circuit:**
This subclass is indented under subclass 64. Subject matter wherein the shift register is characterized by an input circuit having special significance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
55,   for counter systems including particular input circuits and see also search notes thereunder.

SEE OR SEARCH CLASS:
365,   Static Information Storage and Retrieval, subclass 83 for magnetic shift registers having parallel inputs, subclass 219 for memory read write circuitry using parallel inputs and serial outputs and subclass 220 wherein information is written into a memory in parallel form and read output in parallel form.

71   **Pulse shaping:**
This subclass is indented under subclass 70. Subject matter for changing the shape or form of a pulse.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
111,   for particular input circuits for counters, per se.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 100+ for miscellaneous pulse shaping circuits.

72   **With feedback:**
This subclass is indented under subclass 70. Subject matter having means for feeding a portion of the output signal of the register back to the input.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
46,   for systems including a ring counter-type feedback arrangement and see also notes thereunder.
59,   for feedback controlled charge transfer device-type shift registers or counters.

129, for counters where pulses are continuously circulated in a closed feedback loop.

73 Including logic circuit:
This subclass is indented under subclass 70. Subject matter including a circuit for performing a logical operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
81, for shift registers with particular transfer means including a logic circuit.
116, for counters with particular transfer means including a logic circuit.

74 Field-effect transistor:
This subclass is indented under subclass 73. Subject matter where the logic circuit includes a field-effect transistor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
79, for a shift register with particular transfer means including clocking or synchronizing circuits using field-effect transistors.
117, for counters with particular transfer circuits including field-effect transistor logic circuits.

75 Particular output circuit:
This subclass is indented under subclass 64. Subject matter where the register is characterized by having an output circuit of special significance.

SEE OR SEARCH THIS CLASS, SUBCLASS:
56, for counting systems including particular output circuits.
60, for charge transfer device-type counters or shift registers having particular output means.
87, for electromechanical counters having particular output means.
114, for counters in general having particular output circuits.

76 Sequential output (e.g., tapped delay line):
This subclass is indented under subclass 75. Subject matter where information appears successively on a plurality of output terminals.

SEE OR SEARCH THIS CLASS, SUBCLASS:
37, for sequential readout of plural counters in a counting system.
56, for counting systems including a particular output circuit.
114, for particular output circuits for a counter.

SEE OR SEARCH CLASS:
365, Static Information Storage and Retrieval, subclasses 83, 219, 221, and 239 for static memories involving sequential readout means.

77 Particular transfer means:
This subclass is indented under subclass 64. Subject matter where the register is characterized by means of special significance for coupling information from the output of one stage of the register to the input of a succeeding stage.

SEE OR SEARCH THIS CLASS, SUBCLASS:
57+, for charge transfer device-type counters or shift registers having particular transfer means.
115+, for counters or dividers in general including particular transfer means.

SEE OR SEARCH CLASS:
326, Electronic Digital Logic Circuitry, subclasses 93+ for clocking of logic stages or gates in general.

78 Phased clocking or synchronizing:
This subclass is indented under subclass 77. Subject matter where the signals synchronizing operation of the register are applied to two sets of register stages, the signals applied to one set being in time displaced relationship with the signals applied to another set.

SEE OR SEARCH THIS CLASS, SUBCLASS:
104+, for phased clocked counters or dividers.

SEE OR SEARCH CLASS:
326, Electronic Digital Logic Circuitry, subclasses 93+ for clocking or synchronizing of logic stages or gates.

327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 141+ for miscellaneous synchronizing circuits and subclasses 291+ for miscellaneous clock signal generation.

79   Field-effect transistor:
This subclass is indented under subclass 78. Subject matter including a field-effect transistor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
105,   for field-effect transistor-type phase clocked counters or dividers.

SEE OR SEARCH CLASS:
257,   Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, especially subclasses 213+ for field effect devices.
326,   Electronic Digital Logic Circuitry, subclasses 95+ for clocking or synchronizing of FET logic stages or gates.

80   Parallel clocking:
This subclass is indented under subclass 77. Subject matter where the signals synchronizing operation of the register are simultaneously applied to more than one stage of the register.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
106,   for counters or dividers controlled by a particular parallel gating or clock signal.

81   Logic circuit:
This subclass is indented under subclass 77. Subject matter including a circuit for performing a logical operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
73+,   for shift registers having particular input circuits and including logic circuits.
116+,   for counters or dividers having particular transfer means and including logic circuits.

SEE OR SEARCH CLASS:
365,   Static Information Storage and Retrieval, subclass 89 for magnetic shift registers using logic circuits.

82   ELECTROMECHANICAL COUNTER:
This subclass is indented under the class definition. Subject matter including means whereby the electrical pulses to be counted produce a mechanical motion which controls a mechanical counting device.

SEE OR SEARCH CLASS:
235,   Registers, subclasses 93 through 105 for mechanical counters.

83   Counting or dividing chains using relays:
This subclass is indented under subclass 82. Subject matter comprising a plurality of stages connected in a serial arrangement such that the state of one stage is a function of the state of an adjacent stage and the state of a given stage is determined by the position of one or more relays.

84   Programmable (i.e., with variable base):
This subclass is indented under subclass 82. Subject matter including means for varying the modules or base of a counter.

85   Reversible:
This subclass is indented under subclass 82. Subject matter where, in one mode, successive pulses cause the counter to count upward and in another mode cause the counter to count downward.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
45,   for counting systems including a reversible counter.
69,   for shift registers in general having direction control of pulse signals.

SEE OR SEARCH CLASS:
708,   Electrical Computers: Arithmetic Processing and Calculating, subclass 672 for incrementing and decrementing in computational devices and systems.

86 **Particular input means:**
This subclass is indented under subclass 82. Subject matter where the counter is characterized by having input means of special significance.

SEE OR SEARCH THIS CLASS, SUBCLASS:
55, for particular input circuits in systems using counters, dividers, and shift registers.

87 **Particular output means:**
This subclass is indented under subclass 82. Subject matter where the counter is characterized by having output means of special significance.

SEE OR SEARCH THIS CLASS, SUBCLASS:
56, for particular output circuits used in systems employing pulse counters, dividers, or shift registers.

88 **With resetting:**
This subclass is indented under subclass 82. Subject matter for returning the counter to a state representing an initial count.

SEE OR SEARCH THIS CLASS, SUBCLASS:
31, for counting systems including automatic preset circuits for preventing an inaccurate count.
84, for resetting means in programmable electromechanical counters.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 142+ for a miscellaneous synchronizing circuit providing a reset signal which may be responsive to a power supply.

89 **Rotary magnet:**
This subclass is indented under subclass 82. Subject matter where the electromechanical means includes a rotating magnet.

90 **Stepping switch:**
This subclass is indented under subclass 82. Subject matter where the electromechanical means is a multiposition switch which succeeding pulses move through its various positions.

91 **Clutch or escapement:**
This subclass is indented under subclass 82. Subject matter where the electromechanical means includes a clutch or an escapement.

92 **Pawl and ratchet:**
This subclass is indented under subclass 82. Subject matter where the electromagnetic means controls a ratchet.

93 **WITH SUPERCONDUCTIVE ELEMENT:**
This subclass is indented under the class definition. Subject matter where the functional element of the counter is operated at temperatures in the neighborhood of absolute zero where electrical resistance becomes essentially zero.

SEE OR SEARCH CLASS:
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 31 through 36 for superconductive active devices, per se.
326, Electronic Digital Logic Circuitry, subclasses 1+ for superconducting logic circuits.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 86 for a stable state circuit utilizing a superconducting element and subclasses 527+ for miscellaneous superconducting circuits.
365, Static Information Storage and Retrieval, subclasses 160+ for static memory systems using superconductive elements.

94 **COUNTING OR DIVIDING IN INCREMENTAL STEPS (I.E., STAIRCASE COUNTER):**
This subclass is indented under the class definition. Subject matter whereby each pulse is stored and adds an incremental value to the previously existing stored value and an element or circuit is caused to change state when the stored value reaches a predetermined point.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 126+ for a miscellaneous staircase or stepwave generator.

95 Charge storage (e.g., capacitor without polarization hysterisis):
This subclass is indented under subclass 94. Subject matter including a storage element capable of holding a current charge.

(1) Note. The storage element may be for example an integrating capacitor.

96 Using auxiliary pulse generator triggered by incoming pulses:
This subclass is indented under subclass 95. Subject matter where a pulse generator is triggered when the stored value reaches a predetermined point.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 100+ for miscellaneous signal converting, shaping, or generating circuits.

97 Hysteresis storage (e.g., counters using saturable magnetic core elements):
This subclass is indented under subclass 94. Subject matter where the incremental values are points on the hysteresis loop of a particular material.

SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclasses 401+ for nonlinear systems (e.g., saturable).

98 DEVICES HAVING MORE THAN TWO STABLE STATES:
This subclass is indented under the class definition. Subject matter where a pulse counter of frequency divider comprises one or more devices having more than two stable states.

99 Beam type tube (e.g., magnetron, cathode-ray tube):
This subclass is indented under subclass 98. Subject matter where the device having more than two stable states is a tube which generates a beam of atomic particles.

100 Multi-cathode gas discharge tubes:
This subclass is indented under subclass 98. Subject matter where the device having more than two stable states is a gas discharge tube having a plurality of cathodes.

101 USING BISTABLE MAGNETIC CORES OR FERROELECTRIC CAPACITORS:
This subclass is indented under the class definition. Subject matter where the counter or divider utilizes magnetic cores or ferrelectric capacitors having two or more stable states.

SEE OR SEARCH THIS CLASS, SUBCLASS:
97, for counting or dividing in incremental steps using saturable magnetic core elements.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 190+ for a miscellaneous stable state circuit utilizing a transformer or saturable core device.

102 USING BISTABLE ELECTRO-OPTICAL DEVICES:
This subclass is indented under the class definition. Subject matter where the counter or divider utilizes devices for converting light radiation into electrical current and which devices have two or more stable states.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclass 187 for a miscellaneous stable state circuit which is light sensitive.
365, Static Information Storage and Retrieval, subclasses 185.01+ for floating gate memory storage (e.g., flash memory), subclasses 106+ where the condition or state of a memory material or element is altered by a

beam of radiant energy and see also the search notes thereunder and subclasses 215 and 234 for optical read/write circuits and addressing circuits respectively.

103 COUNTING OR DIVIDING CHAINS USING GAS-FILLED TUBES:
This subclass is indented under the class definition. Subject matter comprising a plurality of stages connected in a serial arrangement such that the state of one stage is a function of the state of an adjacent stage and the state of a given stage is determined by the conductive state of a gas-filled tube.

104 PHASED CLOCKING:
This subclass is indented under the class definition. Subject matter where the signals synchronizing operation of the counter are applied to counter stages in a time displaced relationship with one another.

SEE OR SEARCH THIS CLASS, SUBCLASS:
43,   for a counting system including two pulse trains which are time shifted in relation to each other.
78+,   for shift registers having particular transfer means of the phase clocking or synchronizing type.

SEE OR SEARCH CLASS:
326,   Electronic Digital Logic Circuitry, subclasses 93+ for clocking or synchronizing logic stages or gates.
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 141+ for miscellaneous synchronizing circuits.

105 Field-effect transistor:
This subclass is indented under subclass 104. Subject matter including a field-effect transistor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
79,   for shift registers controlled by field-effect transistor-type phase clocking or synchronizing circuits and see also search notes thereunder.

106 PARTICULAR PARALLEL GATING OR CLOCK SIGNAL:
This subclass is indented under the class definition. Subject matter where the signals synchronizing operation of the counter are simultaneously applied to more than one stage of the counter.

SEE OR SEARCH THIS CLASS, SUBCLASS:
80,   for shift registers, per se, having parallel clocking-type signal transfer circuitry.
104+,   for phased clocking of counter and dividing circuits and see also search notes thereunder.

107 STARTING, STOPPING, PRESETTING, OR RESETTING THE COUNTER:
This subclass is indented under the class definition. Subject matter for assisting in initiating operation of the counter, causing operation of the counter to cease or placing the counter in a state representing an initial count.

SEE OR SEARCH THIS CLASS, SUBCLASS:
31,   for systems for preventing an inaccurate count by means of automatic preset.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 142+ for a miscellaneous synchronizing circuit providing a reset signal which may be responsive to a power supply.

108 Counter chains with a radix or base other than the number two raised to an integral power:
This subclass is indented under subclass 107. Subject matter where the number of different states the counter can assume is other than a power of two.

109 Decade:
This subclass is indented under subclass 108. Subject matter where the number of different states the counter can assume is ten.

110   Programmable (e.g., with mechanical or electromechanical switch means for selecting the count):
This subclass is indented under subclass 108. Subject matter including means for varying the modules or base of a counter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
33+,   for counting systems using particular code or counting sequence.
52,   for systems including a programmable counter (i.e., with variable base) and see also search notes thereunder.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 261+ for an output wave-form delay circuit which may utilize a programmable counting device.
368,   Horology: Time Measuring Systems or Devices, appropriate subclasses, for pulse counters which may be preset to determine time.

111   PARTICULAR INPUT CIRCUITS FOR COUNTER:
This subclass is indented under the class definition. Subject matter where the counter is characterized by having a special input circuit.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
55,   for systems using counters, dividers, and shift registers and having particular input circuits.
60,   for charge transfer devices having particular input circuit means.
70+,   for shift registers having a particular input circuit.
86,   for electromechanical counters having particular input means.

112   INDICATING MEANS:
This subclass is indented under the class definition. Subject matter s for providing information as to the state of the counter.

SEE OR SEARCH CLASS:
340,   Communications: Electrical, sub-classes 815.4+ where the information signals and/or results in electrical communication systems are visually displayed.
345,   Computer Graphics Processing and Selective Visual Display Systems, subclasses 1.1 through 3.4 for visual display systems with selective electrical control.
368,   Horology: Time Measuring Systems or Devices, appropriate subclasses, for indicating means for time measuring systems or devices.

113   Using glow discharge lamps:
This subclass is indented under subclass 112. Subject matter where the indication results from an electron discharge through a gas-filled tube.

114   PARTICULAR OUTPUT CIRCUITS FOR COUNTER:
This subclass is indented under the class definition. Subject matter where the counter is characterized by an output circuit having special significance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
56,   for systems using counters, dividers, and shift registers and having particular output circuits.
60,   for charge transfer devices having particular output circuit means.
75+,   for shift registers having a particular output circuit.
87,   for electromechanical counters having particular output means.

115   PARTICULAR TRANSFER MEANS (E.G., MASTER-SLAVE):
This subclass is indented under the class definition. Subject matter where the counter is characterized by a circuit having special significance for transferring the output of one stage of a counter to the input of another stage of the counter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
57+,   for transfer circuits using charge transfer devices (e.g., charge coupled devices, bucket brigade devices).
77+,   for shift registers having particular transfer means.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 202+ for a miscellaneous master-slave bistable latch.

116   Including logic circuit:
This subclass is indented under subclass 115. Subject matter including a circuit for performing a logical operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
81,   for shift registers having logic circuits as the particular transfer means.

SEE OR SEARCH CLASS:
326,   Electronic Digital Logic Circuitry, particularly subclasses 93+ for the clocking or synchronizing of logic stages or gates.

117   Field-effect device (e.g., JFET, IGFET, MNOS):
This subclass is indented under subclass 116. Subject matter where the circuit includes a field-effect device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
79,   for shift registers with phase clocking of transfer means and using field-effect transistors.

SEE OR SEARCH CLASS:
257,   Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, especially subclasses 213+, for field effect devices.

118   PULSE COUNTING OR DIVIDING CHAINS:
This subclass is indented under the class definition. Subject matter comprising a plurality of stages and connected in a serial arrangement such that the state of one stage is a function of the state of an adjacent stage.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
27+,   for systems using one or more counter or divider chains.

57+,   for charge transfer device-type counting and dividing chains.
83,   for chains using relays.
101,   for chains using magnetic cores or ferroelectric capacitors.
102,   for chains using electro-optical devices.
103,   for chains using gas filled tubes.
108,   for counter chains with radix or base other than the number two raised to an integral power.

119   Using bistable regenerative trigger circuits:
This subclass is indented under subclass 118. Subject matter where each stage utilizes a device which, as a result of having a feedback loop gain greater than one, can be changed from a nonconducting to a conducting state by means of a incoming pulse.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 199+ for miscellaneous bistable circuits.

120   Using only semiconductors having at least three electrodes:
This subclass is indented under subclass 119. Subject matter where the only active elements in the trigger circuit are semiconducting devices having three or more electrodes.

SEE OR SEARCH CLASS:
327,   Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 185+ for miscellaneous stable state circuits utilizing a semi-conducting device.

121   Field effect device (e.g., JFET, IGFET, MNOS):
This subclass is indented under subclass 120. Subject matter where the active element is a field-effect device.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
74,   for shift registers using field-effect transistor-type logic circuits in the input circuit.
79,   for shift registers with phase clocking or synchronizing circuits using field-effect transistors.

105, for phase clocked counters using field-effect transistors.
117, for counters having transfer means which use field effect transistors.

SEE OR SEARCH CLASS:
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 208+ for a miscellaneous bistable circuit utilizing an FET.

122 Ring counter:
This subclass is indented under subclass 120. Subject matter where the semiconducting devices are used in the stages of a counter through which information is transmitted serially from input to output (one cycle) and then tranferred back to the input stage where the cycle begins again.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
46, for systems including ring counters.

123 Reversible counter:
This subclass is indented under subclass 120. Subject matter where the semiconducting devices are used in the stages of a counter which, in one mode, counts upward and, in another mode, counts downward.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
45, for systems including reversible counters.

124 Ring counter:
This subclass is indented under subclass 119. Subject matter where the regenerative trigger circuits are used in the stages of a counter through which information is transmitted serially from input to output (one cycle) and then transferred back to the input stage where the cycle begins again.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
46, for systems including ring counters.
122, for ring counters using bistable regenerative trigger circuits including semiconductors having at least three electrodes.

125 Reversible counter:
This subclass is indented under subclass 119. Subject matter where the regenerative trigger circuits are used in the stages of a counter, which, in one mode, counts upward and, in another mode, counts downward.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
45, for systems including reversible counters.
123, for reversible counter chains using bistable regenerative trigger circuits including semiconductors having at least three electrodes.

126 Ring or reversible counter:
This subclass is indented under subclass 118. Subject matter where the regenerative trigger circuits are used (1) in the stages of a counter through which information is transmitted serially from input to output (one cycle) and then transferred back to the input stage where the cycle begins again or (2) in the stages of a counter which, in one mode, counts upward and, in another mode, counts downward.

SEE OR SEARCH THIS CLASS, SUB-CLASS:
45, for systems including reversible counters.
46, for systems including ring counters.
122, for ring counters using bistable regenerative trigger circuits including semiconductors having at least three electrodes.
123, for reversible counter chains using bistable regenerative trigger circuits including semiconductors having at least three electrodes.
124, for ring counter chains in general using bistable regenerative trigger circuits.
125, for reversible counter chains in general using bistable regenerative trigger circuits.

127 Using bistable semiconductors having at least three electrodes or analogous comple-

mentary transistor circuits (e.g., avalanche transistor SCR's):
This subclass is indented under subclass 118. Subject matter where each stage utilizes semiconductors which have two stable states and at least three electrodes or where each stage utilizes complementary transistors connected so as to function in the same way as a single semiconductor having two or more stable states.

SEE OR SEARCH THIS CLASS, SUBCLASS:
120,   for chains using bistable regenerative trigger circuits comprising semiconductors having at least three electrodes.

128   Using bistable semiconductors having only two electrodes (e.g., tunnel diode, multilayer diode):
This subclass is indented under subclass 118. Subject matter where each stage utilizes semiconductors having two stable states and having only two electrodes.

SEE OR SEARCH THIS CLASS, SUBCLASS:
119,   for chains using bistable regenerative trigger circuits.

129   PULSES   CONTINUOUSLY   CIRCULATED IN A CLOSED LOOP:
This subclass is indented under the class definition. Subject matter including means whereby pulses at the output of a circuit are continuously fed back to the input of the circuit.

SEE OR SEARCH THIS CLASS, SUBCLASS:
107,   for means for starting, stopping, or resetting a counter and subclasses, 122, 124, and 126, for ring counters.

130   This subclass is indented under the class definition. Subject matter not classifiable in any of the proceeding subclasses.

END