CLASS 370, MULTIPLEX COMMUNICATIONS

SECTION I - CLASS DEFINITION

A. This is the generic class for multiplexing or duplexing systems, methods, or apparatus.

(1) Note. Multiplexing includes for example, time division multiplexing (TDM) frequency division multiplexing (FDM), orthogonal and quasiorthogonal multiplexing techniques, phantom connections and plural channel adaptive systems.

(2) Note. Selective or telemetering systems which may be analogous to multiplexing techniques are not classified here but elsewhere. (See References to Other Classes, below.)

(3) Note. The distinction between multiplexing and selective or telemetry is: in multiplexing, the information is unrestricted as to content, e.g., a teletype-writer which uses an alphabet to transmit unlimited information, whereas in selective or telemetry devices, the information is restricted as to content, e.g., a transducer measuring a single parameter.
B. This class includes elements and circuits forming subcombinations having a utility unique to multiplexing such as rotary distributors used as multiplexers, synchronizers used to control distribution of multiplexed channels, bridge duplex circuits, resonant circuits having a special utility in a frequency division multiplexing system.

(1) Note. Multiplex modulators, per se, are not classified in this class. See classification elsewhere. (See References to Other Classes, below.)

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

A. Electrical circuits which may be used in multiplexing systems but are not unique to multiplex communications are classified in the appropriate class for such circuits. (See References to Other Classes, below.)

B. Significantly claimed multiplex techniques in combination with the subject matter of Class 178, Telegraphy, Class 375, Pulse or Digital Communications, Class 379, Telephonic Communications, or Class 455 Telecommunications are classified in Class 370, Multiplex Communications.

C Significantly claimed apparatus external to this class, claimed in combination with apparatus under the class definition, which perform multiplexing operations, are classified in the class appropriate to the external device. (see paragraph B above). (See References to Other Classes, below for examples.)

D Nominally claimed apparatus external to this class in combination with apparatus under the class definition, is classified in this class unless provided for in the appropriate external class. For example, a nominally recited coupled network which includes significant multiplexing operations is classified herein.

E. Multiplexing systems and related devices found in other classes, for which see below

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

73, Measuring and Testing, appropriate subclass for significantly claimed apparatus external to this class (370) which perform multiplexing operations.

246, Railway Switches and Signals, appropriate subclass for multiplexed railway signalling information.

318, Electricity: Motive Power Systems, subclass 562 for multiplexed data-transmission links utilized in a servo systems.

324, Electricity: Measuring and Testing, appropriate subclass for significantly claimed apparatus external to this class (370) which perform multiplexing operations.

327, Electrical Transmission or Interconnection Systems, subclasses 407+ and 415+ for converging and diverging signal switched paths, respectively.

329, Demodulators, subclasses 300+ for frequency shift keying demodulator; subclasses 304+ for phase shift keying demodulator; subclasses 311+ for pulse demodulator; subclasses 315+ for frequency modulation demodulator; subclasses 345+ for phase modulation demodulator; and subclasses 347+ for amplitude modulation demodulator.

332, Modulators, subclasses 100+ for frequency shift keying modulator; subclasses 103+ for phase shift keying modulator; subclasses 117+ for frequency modulator; and subclasses 149+ for amplitude modulator.

332, Modulators, subclasses 106+ for multiplex pulse modulation, subclasses 119+ for multiplex frequency modulation, subclasses 144+ for multiplex phase modulation, and subclasses 151+ for multiplex amplitude modulation.

333, Wave Transmission Lines and Networks, subclass 1 for plural transmission lines or networks; subclass 4 for balanced transmission lines; subclass 117 for hybrid-type networks; and subclasses 165 through 167 for wave filters.

340, Communications: Electrical, subclass 853.1 for geophysical systems which may include multiplexing means; subclasses 825-825.98 for selective systems analogous to multiplexing systems (including foreign art collection FOR 107 for a selective loop system); and subclasses 870.11-870.15 for telemetering which may include multiplexing means.

341, Coded Data Generation or Conversion, subclass 141 for multiplex in analog to or from digital conversion.

342, Communications: Directive Radio Wave System and Devices (e.g., Radar, Radio Navigation), subclasses 1 through 25 for radar systems which may include multiplexing systems.

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, appropriate subclasses for display communications which may include multiplexing means.

348, Television, appropriate subclasses for television signal transmission which may use multiplexing techniques.

358, Facsimile and Static Presentation Processing, subclass 425 for multiplex facsimile information.

360, Dynamic Magnetic Information Storage or Retrieval, subclasses 18+ for multiplex magnetic information.

365, Static Information Storage and Retrieval, subclasses 189.01+ and 230.01+, for a static memory system with the handling of signal information or the addressing of memory locations respectively analogous to multiplexing techniques particularly subclasses 189.02 and 230.02 for such a system having multiplexed signals in each of the respective systems.

369, Dynamic Information Storage or Retrieval, subclass 102 for plural information signals multiplexed on an optical storage track..

380, Cryptography, subclasses 255 through 276 for a communication system using cryptography.

381, Electrical Audio Signal Processing Systems and Devices, subclasses 1+ for stereo, especially subclasses 2+ for broadcast and multiplex stereo.

385, Optical Waveguides, subclasses 1+, 4+, or 16+ for optical waveguides with modulation or switching.

398, Optical Communications, subclasses 41 through 42 for duplex optical communication and subclasses 43-103 for multiplex optical communication.

702, Data Processing: Measuring, Calibrating, or Testing, Class appropriate subclasses for significantly claimed apparatus external to this class (370) which perform multiplexing operations.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclasses 200-253 for general purpose programmable computers which may include multiplexing techniques wherein data is transferred between the computers and processing of the data by the computers occurs before or after the data transfer operation.

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclass 316 for data processing intra-system connection which may use a bus switch.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses 3+ for replacement with spare devices, subclass 4 for reconfiguring transmission facility, and subclasses 712+ for transmission facility testing.

725, Interactive Video Distribution Systems, appropriate subclasses for video signal transmission which may use multiplexing techniques.

SECTION IV - GLOSSARY

BANDWIDTH

The width of a communications channel.

LOCAL AREA NETWORK (LAN)

A relatively short distance data communication network linking computers and other devices utilizing some type of standard control.

MULTIPLEXING

The simultaneous transmission of two or more information signals in either or both directions over a common (same) transmission medium in such a manner that the information signals may be discretely recovered.

PROTOCOL

A specific set of rules about data format and data transmission timing between two devices.

SUBCLASSES

200 PHANTOM:
This subclass is indented under the class definition. Subject matter wherein an additional channel is derived from two suitable arranged pairs of wires called side channels, and each pair of wires is a channel itself and at the same time acts as one conductor of the phantom channel.

(1) Note. The phantom channel is added by differentially modulating the longitudinal, common mode signals of each wire channel at one end of both wire channels and by detecting the difference at the other end of said wire channels. Signals from the phantom channel thus are canceled from the output of the individual wire channels, but appear as the difference between values of common mode currents carried by the wire channels.

SEE OR SEARCH CLASS:
178, Telegraphy, subclass 45 for a phantom connection on a loaded circuit.

201 CROSSTALK SUPPRESSION:
This subclass is indented under the class definition. Subject matter including special arrangements to eliminate interference among multiplexed channels.

SEE OR SEARCH THIS CLASS, SUBCLASS:
278, and 282+, for a transmit/receive interaction control in a duplex system.

SEE OR SEARCH CLASS:
178, Telegraphy, subclasses 69+ for circuit maintenance.
379, Telephonic Communications, subclass 417 for telephone cross talk suppression, in general.
381, Electrical Audio Signal Processing Systems and Devices, subclasses 13, 47, 71.1+, 83, 93, and 94.1+ for noise and feedback suppression in a one-way audio signal transmission system.
455, Telecommunications, subclass 24 , 63.1-65, 135, 222-224, 278.1, 283-288, 296-312, and subclasses 501-506 for noise suppression in a radio system in general.

202 AMPLITUDE COMPRESSION OR EXPANSION:
This subclass is indented under the class definition. Subject matter wherein magnitude or a signal is reduced prior to transmission and a corresponding magnitude restoration is performed at reception.

SEE OR SEARCH THIS CLASS, SUBCLASS:
477, for a multiplex system using bandwidth conservation technique.
521, for a multiplex system with time compression or expansion.

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclass 14 for a companding device.
341, Coded Data Generation or Conversion, appropriate subclasses for a code converter which may include bandwidth reduction.
348, Television, subclasses 384.1 through 440.1 for bandwidth reduction relating to analog television signal processing.
358, Facsimile and Static Presentation Processing, subclasses 426.01 through 426.16 for bandwidth reduction relating to video processing..
375, Pulse or Digital Communications, subclasses 240.01 through 240.29 for digital television bandwidth compression system.
381, Electrical Audio Signal Processing Systems and Devices, subclasses 29+ for audio bandwidth compression or expansion.

203 GENERALIZED ORTHOGONAL OR SPECIAL MATHEMATICAL TECHNIQUES:
This subclass is indented under the class definition. Subject matter wherein (a) a multiplexed channel is uniquely identified and separated from other multiplexed channels by members of a pair of mathematical functions having a sum of products or having an integral that is zero or sometimes one under specified conditions, or (b) particular mathematical processes are used to achieve multiplexing techniques.

(1) Note. This subclass does not include TDM or FDM techniques.

SEE OR SEARCH CLASS:
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 400+ for orthogonal transformations.

204 Plural diverse modulation techniques:
This subclass is indented under subclass 203. Subject matter wherein a wave carrier of information is being modified by more than one modulation technique.

SEE OR SEARCH THIS CLASS, SUBCLASS:
478, for a system employing both time division and frequency division multiplex.

SEE OR SEARCH CLASS:
332, Modulators, subclass 108 for multiplex pulse modulation, per se; subclasses 119+ for multiplex frequency modulation, per se; subclasses 144+ for multiplex phase modulation, per se; and subclasses 151+ for multiplex amplitude modulation, per se.
375, Pulse or Digital Communications, appropriate subclass for nonmultiplexed pulse or digital modulation in combination with analog modulation.
381, Electrical Audio Signal Processing Systems, and Devices, subclasses 2+ for broadcast or multiplex stereo systems using plural diverse types of modulation.
455, Telecommunications, subclass 102 for plural modulations of nonmultiplexed analog signals.

205 Pulse width and pulse position modulation:
This subclass is indented under subclass 204. Subject matter wherein information is contained in the time duration of a pulse (pulse width) and in the time of occurrence (pulse position) of one pulse after a reference pulse.

SEE OR SEARCH CLASS:
332, Modulators, subclass 108 for multiplex pulse modulation, per se.

206 Quadrature carriers:
This subclass is indented under subclass 203. Subject matter wherein two carrier frequencies are 90 degrees in phase (i.e., quadrature or orthogonal in phase), e.g., sin2 wt and cos2 wt.

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, subclass 235 for equalizing of digital quadrature channels.
381, Electrical Audio Signal Processing Systems and Devices, subclasses 19+ for quadrasonic stereo channels.

207 Having a signaling constellation:
This subclass is indented under subclass 206. Subject matter wherein supervisory information is transmitted or received in a symbol pattern different from the symbol pattern carrying the primary information, and wherein the symbol patterns are generated using quadrature modulation technique (e.g., QAM, QPSK, etc.).

208 Particular set of orthogonal functions:
This subclass is indented under subclass 203. Subject matter wherein a special set of orthogonal functions are used to achieve multiplexed transmission (e.g., Legendre polynomials, Bessel functions).

209 Walsh functions:
This subclass is indented under subclass 208. Subject matter wherein the set of orthogonal functions consist of Walsh functions.

SEE OR SEARCH CLASS:
708, Electrical Computers: Arithmetic Processing and Calculating, subclass 410 for a Walsh transformation using an

electric digital calculating computer in a nonmultiplex communication.

210 Fourier transform:
This subclass is indented under subclass 203. Subject matter utilizing a special mathematical relationship that provides a connection between information in the frequency domain and the time domain.

SEE OR SEARCH CLASS:
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 403+ for a Fourier transform using an electric digital calculating computer in a nonmultiplex communication.

211 Level multiplex:
This subclass is indented under subclass 203. Subject matter wherein two or more information signals, each of the signals having a unique amplitude or level, are combined to form a combined signal wherein the individual information signals are separable by amplitude or level.

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, subclasses 286+ for a pulse waveform with two or more discrete amplitude levels.

212 PULSE WIDTH (PULSE DURATION) MODULATION:
This subclass is indented under the class definition. Subject matter wherein information is contained in the time duration of a pulse.

SEE OR SEARCH THIS CLASS, SUBCLASS:
213, for pulse position modulation.

SEE OR SEARCH CLASS:
332, Modulators, subclasses 109+ for a multiplex pulse width modulator, per se.
375, Pulse or Digital Communications, subclass 238 for nonmultiplex pulse width modulation.

213 PULSE POSITION MODULATION:
This subclass is indented under the class definition. Subject matter wherein information is contained in the time of occurrence of a pulse after a reference pulse.

SEE OR SEARCH THIS CLASS, SUBCLASS:
212, for pulse width modulation.

SEE OR SEARCH CLASS:
332, Modulators, subclasses 112+ for a multiplex pulse position modulator, per se.
375, Pulse or Digital Communications, subclass 239 for nonmultiplex pulse position modulation.

214 SIMULTANEOUS TELEGRAPHY AND TELEPHONY:
This subclass is indented under the class definition. Subject matter including concurrent transmission of bidirectional pulse information signal and audio signal over a single transmission channel.

SEE OR SEARCH CLASS:
379, Telephonic Communications, subclasses 108.01+ for alternative transmission of a telegraph or telephone signal over a single channel.

215 PHASE MODULATION:
This subclass is indented under the class definition. Subject matter wherein information is contained in a shift in phase of a carrier frequency with respect to a reference phase.

SEE OR SEARCH CLASS:
332, Modulators, subclasses 144+ for a multiplex phase modulator, per se.
455, Telecommunications, subclasses 110+ for angle modulation of transmitting signals; and subclasses 205+ for phase modulation of receiving signals.

216 FAULT RECOVERY:
This subclass is indented under the class definition. Subject matter wherein a corrective action is taken to return a faulty device or system to a satisfactory operating condition.

(1) Note. Data flow congestion is not considered to be a fault.

SEE OR SEARCH THIS CLASS, SUBCLASS:

229+, for data flow congestion prevention or congestion control in a multiplex system.

241+, for the diagnostic testing of a normal or abnormal operation of a multiplex communication element or system without any necessary corrective action.

SEE OR SEARCH CLASS:

714, Error Detection/Correction and Fault Detection/Recovery, subclasses 2+ for fault recovery of generic information processing system which is not limited to multiplex communication.

217 Bypass an inoperative switch or inoperative element of a switching system:
This subclass is indented under subclass 216. Subject matter including a switching system or network which has a provision for alternate routing when the system is fault.

SEE OR SEARCH THIS CLASS, SUBCLASS:

244, for fault detection of a switching system.

250+, for testing of a standard operation of a switching system.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclasses 3.43 and 3.44 for selective communication monitoring in a faulty condition.

218 Packet switching system or element:
This subclass is indented under subclass 217. Subject matter wherein information routed in the switching system is organized by one or more bytes preceded by an address header.

SEE OR SEARCH THIS CLASS, SUBCLASS:

389, for packet switching, per se.

219 Standby switch:
This subclass is indented under subclass 218. Subject matter wherein the provision for alternate routing of packet switched traffics is a spare or backup switch.

220 Standby switch:
This subclass is indented under subclass 217. Subject matter wherein the provision for alternated routing in the switching system is a spare or backup switch.

221 Bypass an inoperative station:
This subclass is indented under subclass 216. Subject matter wherein a faulty node or terminal is excluded from service.

SEE OR SEARCH CLASS:

714, Error Detection/Correction And Fault Detection/Recovery, appropriate subclasses for fault detection and recovery of a digital data system which is generic and not limited to multiplex communications, particularly subclasses 3+ for reconfiguration of a system to provide correction in response to a fault.

222 In a ring or loop network:
This subclass is indented under subclass 221. Subject matter wherein the inoperative station is an element in a closed path transmission system.

223 Using a secondary ring or loop:
This subclass is indented under subclass 222. Subject matter wherein the inoperative station is bypassed by using an auxiliary closed transmission loop.

224 Loopback of signals on the secondary ring or loop:
This subclass is indented under subclass 223. Subject matter wherein information on the secondary loop is transmitted in reverse direction with the normal transmission loop.

225 Bypass an inoperative channel:
This subclass is indented under subclass 216. Subject matter wherein another path or channel is selected and substituted for a path or channel that is malfunctioning.

226 In a repeater system:
This subclass is indented under subclass 225. Subject matter wherein the communication system has at least one retransmission station wherein an alternate communication channel is provided to convey information when a primary channel or link is failed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
242, for fault detection of a repeater system.
246+, for testing of a standard operation of a repeater.
274, for a quadruplex repeater.
279, and 293, for a duplex repeater.
315+, for a repeater in communication over free space.
492, for repeating information via a frequency channel.
501+, for repeating information via a time channel.

SEE OR SEARCH CLASS:
379, Telephonic Communications, subclass 4 for nonmultiplex telephone alternate routing around a faulty repeater.

227 Using a spare channel:
This subclass is indented under subclass 226. Subject matter wherein the multiplex repeater system has a primary and a backup or protection line, and the backup line is activated to route information data when the primary channel is malfunctioning.

228 Spare channel:
This subclass is indented under subclass 225. Subject matter wherein the multiplex system has a primary and a backup line, and the backup is activated to routed information data when the primary channel is malfunctioning.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclass 825.01 for selective communications with a spare channel.
714, Error Detection/Correction and Fault Detection/Recovery, subclass 4 for replacement with spare transmission facility or channel which is not a multiplex communication system.

229 DATA FLOW CONGESTION PREVENTION OR CONTROL:
This subclass is indented under the class definition. Subject matter including provisions for (a) avoiding or (b) regulating an actual or potential traffic overload condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241+, for the diagnostic testing of a multiplex communication element or system without any necessary action for regulating the traffic overload condition.

SEE OR SEARCH CLASS:
704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, And Audio Compression/Decompression, subclass 270.1 for speech assisted network.

230 Control of data admission to the network:
This subclass is indented under subclass 229. Subject matter having means for regulating the amount of data entering a multiplex network so as to prevent an overloading or a further overloading of the network.

SEE OR SEARCH THIS CLASS, SUBCLASS:
235, for regulating the flow of data between switches or nodes in a network.

230.1 Traffic shaping:
This subclass is indented under subclass 230. Subject matter wherein the data admission control provides consistent packet/cell flow.

(1) Note. Consistent cell flow may be achieved by varying delay.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.1 through 395.72 for generic message transmission using fixed length packets, and 395.4-395.43 for scheduling in generic message transmission using fixed length packets.

231 End-to-end flow control:
This subclass is indented under subclass 230. Subject matter wherein a signaling between an originating terminal point and a destination terminal point regulates the amount of information transmitted into the network.

232 Based on data flow rate measurement:
This subclass is indented under subclass 230. Subject matter wherein the control of data flow overload is based on a measurement of the amount of information transmitted per unit time.

SEE OR SEARCH THIS CLASS, SUBCLASS:
252+, for determination of communication parameters which may includes a measurement of data flow rate.

233 Measurement of the peak data flow rate:
This subclass is indented under subclass 232. Subject matter wherein the control of data flow overload is based on a measurement of a maximum value of data flow rate.

234 Measurement of the average data flow rate:
This subclass is indented under subclass 232. Subject matter wherein the control of data flow overload is based on a measurement of a medial value of the data flow rate.

235 Flow control of data transmission through a network:
This subclass is indented under subclass 229. Subject matter having means to regulate the amount of information transmitted through the network once the data is in the network.

SEE OR SEARCH THIS CLASS, SUBCLASS:
230+, for regulation the flow of data at a network entry point.

235.1 Using leaky bucket technique:
This subclass is indented under subclass 235. Subject matter wherein network flow control is achieved by a technique which utilizes packet storage having scheduled output therefrom at a uniform rate.

236 Including signaling between network elements:
This subclass is indented under subclass 235. Subject matter wherein supervisory or control information is transmitted between switches or nodes to control data flow between switches or nodes.

236.1 Using RM (Resource Management) cells:
This subclass is indented under subclass 236. Subject matter wherein fixed length packets which indicate current network bandwidth (e.g., cell rate) and congestion conditions are fed back to a network source.

236.2 Using OAM (Operation, Administration and Maintenance) cells:
This subclass is indented under subclass 236. Subject matter wherein performance monitoring cells related to congestion are distributed to network elements.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241.1, for diagnostic testing using OAM cells.

237 Congestion based rerouting:
This subclass is indented under subclass 235. Subject matter wherein data is communicated on an alternate channel when a preferred or desired channel is unavailable due to excessive amounts of information already being carried on the preferred or desired channel.

238 Least cost or minimum delay routing:
This subclass is indented under subclass 235. Subject matter wherein data is communicated on a channel or channels based upon the determination that the selected channel or channels will have the lowest (a) toll, expense, or (b) delay.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 445 for radiotelephone least cost call routing.

238.1 ATM least cost routing:
This subclass is indented under subclass 238. Subject matter wherein data is communicated in a network utilizing fixed length asynchronous transfer mode packets (i.e., ATM cells) based upon a determination that a selected

channel or channels will have the lowest toll or expense.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.1 through 395.72, for message transmittal using fixed length ATM packets in general.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 445 for cellular radiotelephone least cost routing.
709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclass 241 for computer-to-computer least weight routing.

239 Using antijabber circuit:
This subclass is indented under subclass 229. Subject matter having circuitry for disabling a device which is transmitting more information than allocated or transmitting for a greater period of time than allocated.

240 In a star coupler:
This subclass is indented under subclass 239. Subject matter wherein the antijabber circuit is in a coupling means that distributes signals from one or more inputs among a larger number of outputs.

241 DIAGNOSTIC TESTING (OTHER THAN SYNCHRONIZATION):
This subclass is indented under the class definition. Subject matter wherein at least part of a multiplex system is to be evaluated for its performance.

(1) Note. This subclass may include a sole monitoring operation, i.e., a terminal which displays or indicates the operating state of the multiplex communication system or element.

(2) Note. Testing for the purpose of synchronization in the multiplex communication via time channels is not classified in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
216+, for fault recovery in a multiplex system.
229+, for preventing or controlling an overload condition in a multiplex system.
503+, for monitoring of synchronization which may include testing for the purpose of synchronization.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclasses 500+ for a generic conditional responsive alarm system.
375, Pulse or Digital Communications, subclass 224 for testing of a digital communication system.
379, Telephonic Communications, subclasses 1.01 through 35, for testing of a telephone system.
714, Error Detection/Correction and Fault Detection/Recovery, subclasses 25+ for diagnostic testing of a generic information processing system organization which is not limited to multiplex communication, and subclasses 712+ for generic transmission facility testing.

241.1 Using OAM (Operation, Administration and Maintenance) cells:
This subclass is indented under subclass 241. Subject matter which utilizes performance monitoring cells to perform diagnostic testing.

(1) Note. Performance monitoring may generate a subsequent alarm.

(2) Note. Diagnostic testing may detect loss of signals, frames, or pointers, or failure of equipment.

SEE OR SEARCH THIS CLASS, SUBCLASS:
236.2, for data flow congestion prevention or control using OAM cells.

242 Fault detection:
Subject matter under subclasses 241 wherein the multiplex communication system is tested for any nonstandard operating condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:
216+, for multiplex communication systems which take corrective actions in response to the detection of a fault.

243 Of a repeater system:
This subclass is indented under subclass 242. Subject matter wherein a retransmission station in the multiplex system is tested for any nonstandard operating condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:
226, for fault recovery by alternate routing in a repeater system.
246+, for testing of a standard operation of a repeater.
274, for a quadruplex repeater.
293, for a duplex repeater.
315+, for a repeater in communications over free space.
492, for a repeater communicating information by combining or distributing via frequency channels.
501+, for a repeater communicating information by combining or distributing via time channels.

244 Of a switching system:
This subclass is indented under subclass 242. Subject matter wherein a multiplex switching system is tested for any nonstandard operating condition.

SEE OR SEARCH THIS CLASS, SUBCLASS:
217+, for fault recovery by bypassing a faulty switch.
250+, for testing of a standard operation of a switching system.

245 Of a local area network:
This subclass is indented under subclass 242. Subject matter wherein a communication network over a limited geos:graphical area is tested for any nonstandard operating condition.

246 Of a repeater:
This subclass is indented under subclass 241. Subject matter including the testing of a standard operation of a multiplex signal retransmission station.

(1) Note. The repeater is often a duplex or a bidirectional repeater.

SEE OR SEARCH THIS CLASS, SUBCLASS:
226, for fault recovery by alternate routing in a repeater system.
243, for fault detection of a repeater system.
274, for a quadruplex repeater.
293, for a duplex repeater.
315+, for a repeater in communications over free space.
492, for a repeater communicating information by combining or distributing via frequency channels.
501+, for a repeater communicating information by combining or distributing via time channels.

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, subclass 213 for testing of a digital repeater.
379, Telephonic Communications, subclass 4 for testing of a bidirectional telephone repeater.
714, Error Detection/Correction and Fault Detection/Recovery, subclass 713 for generic testing of a communication channel including a repeater.

247 Having a dedicated test line or channel:
This subclass is indented under subclass 246. Subject matter wherein a specified transmission link or channel is committed for the testing of a repeater system.

SEE OR SEARCH THIS CLASS, SUBCLASS:
251, for testing of a switching system with dedicated test line or channel.
438+, for channel assignment using a separate control line or bus for access control.
524, for communication via time channels using a dedicated signaling channel.

248 Path check:
This subclass is indented under subclass 241. Subject matter wherein a link through a multiplex system or a connection established

through a multiplex switching network is monitored for circuit continuity.

SEE OR SEARCH THIS CLASS, SUBCLASS:
351+, for locating a path through a multiplex switching system.

249 Loopback:
This subclass is indented under subclass 241. Subject matter wherein an equipment is tested by connecting a received path to a transmitted path and monitoring the output as an indication of the condition of the equipment.

(1) Note. Included are arrangements providing loopback within a single terminal.

250 Of a switching system:
This subclass is indented under subclass 241. Subject matter including an evaluation of a multiplex switching system.

SEE OR SEARCH THIS CLASS, SUBCLASS:
217+, for bypassing a faulty switch.
244, for fault detection of a switching system.
360+, for controlling the switching of signals through a circuit switch.

251 Having dedicated test line or channel:
This subclass is indented under subclass 250. Subject matter wherein a specified transmission link or channel is committed for the testing of a switching system.

252 Determination of communication parameters:
This subclass is indented under subclass 241. Subject matter wherein a particular communication parameter is measured (e.g., traffic noise ratio, freeze out ratio, etc.).

253 Measurement of flow rate of messages having an address header:
This subclass is indented under subclass 252. Subject matter wherein the communication parameter is the amount of information transmitted per unit time over a network, and wherein information signal is represented by one or a group of bytes preceded by identification information indicative of a source or destination station.

SEE OR SEARCH THIS CLASS, SUBCLASS:
232+, for measurement of data flow rate to control the admission of data to the multiplex network.

254 NETWORK CONFIGURATION DETERMINATION:
This subclass is indented under the class definition. Subject matter including apparatus or techniques for determining what or how network elements are interconnected.

SEE OR SEARCH THIS CLASS, SUBCLASS:
351+, for pathfinding or routing.

255 Using a particular learning algorithm or technique:
This subclass is indented under subclass 254. Subject matter wherein the network uses a set of rules for solving a problem (configuration determination) in a well defined number of steps and also has an ability to create or adjust its own set of such rules.

256 Spanning tree:
This subclass is indented under subclass 255. Subject matter wherein one node from a plurality of nodes in the network is selected as a root or base node with branches interconnecting other nodes to the root node, and wherein the network configuration is determined by the relationship between the branch nodes and the root node.

SEE OR SEARCH THIS CLASS, SUBCLASS:
408, for packet routing in a switching network having nodes interconnected in a hierarchy to form a tree.

257 In a bus system:
This subclass is indented under subclass 254. Subject matter involving the configuration determination in a network having a common transmission line (bus) forming a communication path between a plurality of the user's terminals with the network.

(1) Note. Terminal address determination is properly classified in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
457, for initialization of a token passing communication system (i.e., IEEE 802.4).

258 In a ring system:
This subclass is indented under subclass 257. Subject matter including the configuration determination in a bus network having a closed transmission path.

SEE OR SEARCH THIS CLASS, SUBCLASS:
453, for initialization of a token passing loop or ring communication system (i.e., IEEE 802.5).

259 SPECIAL SERVICES:
This subclass is indented under the class definition. Subject matter including provisions for subscriber services normally provided with additional fees in a multiplex communication network.

(1) Note. Examples of the special services are conferencing, repertory dialing, call forwarding or transfer, paging, and call waiting, etc.

SEE OR SEARCH CLASS:
348, Television, subclasses 14.01 through 14.16 for interactive videophone which may include multiplex communication.
379, Telephonic Communications, subclasses 201.01 through 218.01 for special services in a telephone system which are not limited to a multiplex communication system

260 Conferencing:
This subclass is indented under subclass 259. Subject matter which enables three or more terminals to be included in a single call connection.

SEE OR SEARCH CLASS:
348, Television, subclasses 14.08 through 14.1 for video conferencing.
379, Telephonic Communications, subclasses 202.01 through 206.01 for telephonic conferencing.

261 Technique for setting up a conference call:
This subclass is indented under subclass 260. Subject matter including details of a process or procedure for connecting conferees.

(1) Note. This subclass includes supervision or control in connecting a call.

262 Operator setup of the conference:
This subclass is indented under subclass 261. Subject matter wherein an operator assists in connecting conferees.

263 Conferee signals combined or distributed via time channels:
This subclass is indented under subclass 260. Subject matter wherein conferee signals are assembled or separated via different time periods.

264 Using plural diverse channel communications with a dedicated signaling channel (i.e., ISDN):
This subclass is indented under subclass 263. Subject matter including a digital communication network which simultaneously provides diverse data services including voice, data, or video, the network typically provides the user or subscriber access to information bearing channels and an indicating channel (i.e., 2 B-Channels + 1 D-Channel).

(1) Note. ISDN is an abbreviation of Integrated System Digital Network.

265 Particular technique for combining diverse information types:
This subclass is indented under subclass 263. Subject matter including specific details of techniques for combining voice with nonvoice data signals for transmission in the conference communication.

(1) Note. The nonvoice data signals may be related or unrelated to the voice signal

(2) Note. This subclass may include nominal video signal and significant multiplexing technique.

266 Using summation of conferee signals:
This subclass is indented under subclass 263. Subject matter including a technique for adding conferee signals.

267 Digital summation:
This subclass is indented under subclass 266. Subject matter including a technique for adding discrete type conferee signals.

268 Including cancellation of certain signals:
This subclass is indented under subclass 267. Subject matter wherein the digital summation is combined with a subtraction of certain signals (e.g., canceling one of the conferee signals).

269 Including cancellation of certain signals:
This subclass is indented under subclass 266. Subject matter wherein the summation is combined with a subtraction of certain signals.

270 Distribution of signals to multiple agent stations:
This subclass is indented under subclass 259. Subject matter having a central controller which receives incoming signals and distributes signals to operators at more than one station in the system.

271 Special feature of multiplex telephone terminal:
This subclass is indented under subclass 259. Subject matter including structural details of a telephone used to provide special services to a subscriber in the multiplex communications.

SEE OR SEARCH CLASS:
379, Telephonic Communications, subclasses 157 through 158 and 201.01-218.01 which may have special service telephone terminals without dealing with multiplex communications.

272 SEXTUPLEX:
This subclass is indented under the class definition. Subject matter for the simultaneous transmission of six messages, three in each direction over the same transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
273+, for a quaduplex system.
276, for a duplex system.
297, for a diplex system.

273 QUADRUPLEX:
This subclass is indented under the class definition. Subject matter for the simultaneous transmission of four messages, two in each direction over the same transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
272, for a sextuplex system.
276, for a duplex system.
297, for a diplex system.

SEE OR SEARCH CLASS:
178, Telegraphy, subclass 66.1 for simplex transmission with pulsating currents.

274 Repeater:
This subclass is indented under subclass 273. Subject matter in which a retransmission station is adapted to quadruplex work.

SEE OR SEARCH THIS CLASS, SUBCLASS:
279, and 293, for a radio and a wire duplex repeater, respectively.
315+, for a repeater used in communication over free space.
492, for a repeater used in multiplex communications over frequency channels.
501, for a repeater used in multiplex communications over time channels.

SEE OR SEARCH CLASS:
178, Telegraphy, subclasses 70+ for a repeating system other than quadruplex repeater.
330, Amplifiers, appropriate subclasses, particularly subclass 61 for amplifier (one-way repeater).
375, Pulse or Digital Communications, subclasses 211+ for a pulse or digital repeater communication system.
379, Telephonic Communications, subclasses 338+ for a two way repeater, specific to telephony and acting usually through varying current and contact pressure rather than by current interruptions.

455, Telecommunications, subclasses 7+ for analog repeater communication systems.

275 Duplex diplex:
This subclass is indented under subclass 273. Subject matter wherein quadruplexing is achieved by diplexing two duplex systems or by duplexing two diplex systems.

SEE OR SEARCH THIS CLASS, SUBCLASS:
276, for a duplex system.
297, for a diplex system.

276 DUPLEX:
This subclass is indented under the class definition. Subject matter for effectively transmitting messages simultaneously, one in each direction, over the same transmission medium.

(1) Note. Circuits convertible to full duplex operation are also classified here.

(2) Note. Full duplex describes two data paths which allow simultaneous data transmission in both directions. Half duplex describes one data path which allows data transmission in either of two directions, but only one direction at a time.

SEE OR SEARCH THIS CLASS, SUBCLASS:
272, for a sextuplex system.
273+, for a quadruplex system.
275, for a duplex diplex system.
296, for a circuit convertible to half duplex.
297, for a diplex system.

277 Communication over free space:
This subclass is indented under subclass 276. Subject matter wherein multiplex communication signals are transmitted over a medium which is not a wire or a waveguide.

(1) Note. A waveguide may be used in this communication system for other purpose (e.g., for coupling).

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, appropriate subclasses for digital communications not limited to multiplex communications.
398, Optical Communications, subclasses 41 through 42 for duplex optical communication and subclasses 43-103 for multiplex optical communication.
455, Telecommunications, appropriate subclasses for nonmultiplex radio communications.

278 Transmit/receive interaction control:
This subclass is indented under subclass 277. Subject matter having means at a station to reduce, neutralize, or prevent transfer of an unwanted communication energy between a transmitter and a receiver so that the transmitted communication energy (e.g., carrier or message signal) does not adversely affect the receiver, or so that the received communication energy does not adversely affect the transmitter.

(1) Note. Means may be provided to feed a portion of the transmission energy to the receiver, or a portion of the received energy to the transmitter for monitoring or cancellation.

279 Duplex repeaters:
This subclass is indented under subclass 277. Subject matter including circuitry for compensating attenuation losses of duplex signals or for increasing the communication range for extension terminal equipment at either end of a duplex transmission line.

SEE OR SEARCH CLASS:
178, Telegraphy, subclasses 70+ for a telegraphic nonmultiplex repeater.
455, Telecommunications, subclasses 7+ for a nonmultiplex telecommunication repeater system.

280 Time division:
This subclass is indented under subclass 277. Subject matter wherein duplex transmission and reception signals access a transmission medium in separate time intervals at such a rate

as to give the appearance of a simultaneous transmission and reception.

SEE OR SEARCH THIS CLASS, SUBCLASS:
345+, for a wireless multiplex communications via time channels not limited to a duplex system.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 73 for a push-to-talk transceiver.

281 Frequency division:
This subclass is indented under subclass 277. Subject matter wherein simultaneous transmission and reception between communicating stations occur in separate portions of the frequency spectrum of the transmission medium.

(1) Note. Classification here requires more than merely two stations in communication on different frequencies. Full duplex operation (i.e., simultaneous transmission and reception by each station) is required.

SEE OR SEARCH THIS CLASS, SUBCLASS:
343+, for wireless multiplex communications via frequency channels not limited to a duplex system.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 23 for a nonmultiplex frequency carrier wave repeater system.

282 Transmit/receive interaction control:
This subclass is indented under subclass 276. Subject matter having means at a station to reduce, neutralize, or prevent transfer of an unwanted communication energy between a transmitter and a receiver so that the transmitted communication energy (e.g., carrier or message signal) does not adversely affect the receiver, or so that the received communication energy does not adversely affect the transmitter.

(1) Note. Means may be provided to feed a portion of the transmission energy to the receiver, or a portion of the received energy to the transmitter for monitoring or cancellation.

283 Artificial line:
This subclass is indented under subclass 282. Subject matter in which an electrical equivalent of a transmission line is used to balance out an effect of local transmission current on a local receiving device so the local receiving device responds only to signals from the remote transmitter.

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclasses 4+ for plural channel systems with balance circuits and subclass 23 for an artificial line in a wave transmission lines or network.

284 Differential:
This subclass is indented under subclass 282. Subject matter wherein a signal is subtracted from a composite to achieve separation of transmitted and received signals.

285 Bridge:
This subclass is indented under subclass 282. Subject matter wherein the duplex system comprises a circuit type wheatstone-bridge in which substantial neutrality of a receiving apparatus to transmitted currents is obtained by impedance balance.

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclass 117 for a hybrid circuit, per se.
379, Telephonic Communications, subclass 345 for a hybrid circuit used with a telephone repeater and subclasses 402+ for hybrid circuit used in telephone line interfacing.

286 Echo suppression or cancellation:
This subclass is indented under subclass 282. Subject matter having means to reduce undesirable effects caused by reflected communication signals.

SEE OR SEARCH CLASS:
379, Telephonic Communications, subclasses 406+ for this subject matter in a nonmultiplexed telephone circuit.

287 Disabling or inhibiting:
This subclass is indented under subclass 286. Subject matter wherein the echo cancellation or suppression is performed by blocking a certain signal.

288 Using an attenuator:
This subclass is indented under subclass 286. Subject matter wherein a device is used to reduce the magnitude of the reflected communication signal.

289 Having residual echo cancellation or suppression:
This subclass is indented under subclass 286. Subject matter wherein an apparatus is provided to cancel or suppress the echo remaining after the main echo has been suppressed.

290 Using a particular adaptive filter:
This subclass is indented under subclass 286. Subject matter having a filtering apparatus which adapts itself to the varying echo signal to suppress or cancel the echo in the main or primary signal.

291 Using a transversal filter:
This subclass is indented under subclass 290. Subject matter wherein the filtering apparatus is consists of one or more tapped delay lines with a summing or weighing circuit.

292 Using a training sequence:
This subclass is indented under subclass 286. Subject matter wherein a particular information signal is communicated to teach an echo canceler or suppressor how to cancel or suppress an echo.

293 Duplex repeaters or extenders:
This subclass is indented under subclass 276. Subject matter including circuitry for compensating for attenuation losses of duplex signals or for increasing the communication range for extension terminal equipment at either end of a duplex transmission line.

SEE OR SEARCH CLASS:
178, Telegraphy, subclasses 70+ for a teles:graphic nonmultiplex repeater.
330, Amplifiers, for an amplifier which may be used as a repeater.
379, Telephonic Communications, subclasses 338+ for a telephonic nonmultiplex repeater.
455, Telecommunications, subclasses 7+ for a nonmultiplex telecommunication repeater system.

294 Time division:
This subclass is indented under subclass 276. Subject matter wherein duplex transmission and reception signals access a transmission medium in separate time intervals at such a rate as to give the appearance of a simultaneous transmission and reception.

SEE OR SEARCH THIS CLASS, SUBCLASS:
498+, for combining or distributing information via time channels not limited to a duplex system.

295 Frequency division:
This subclass is indented under subclass 276. Subject matter wherein simultaneous transmission and reception between communicating stations occur in separate portions of the frequency spectrum of the transmission medium.

(1) Note. Classification here requires more than merely two stations in communication on different frequencies. "Full duplex operation" (i.e., simultaneous transmission and reception by each station) is required.

(2) Note. FDM duplex systems (i.e., FDM signals simultaneously transmitted and received) are classified here.

SEE OR SEARCH THIS CLASS, SUBCLASS:
480+, for combining or distributing information via frequency channels not limited to a duplex system.

296 Convertible to half duplex:
This subclass is indented under subclass 276. Subject matter wherein the transmission and reception of signals occur alternately rather than substantially simultaneously, but where the circuitry is convertible to full duplex operation.

297 DIPLEX:
This subclass is indented under the class definition. Subject matter for the simultaneous transmission of two messages in the same direction over the same transmission medium.

(1) Note. This subclass is the home for diplex telegraphy.

SEE OR SEARCH THIS CLASS, SUBCLASS:
275, for combination of duplex and diplex means in a quadruplex system.
276+, for a duplex system.

298 LOW SPEED ASYNCHRONOUS DATA SYSTEM (E.G., TELETYPEWRITER SERVICE):
This subclass is indented under the class definition. Subject matter wherein the multiplex feature is unique to a system in which data flow is normally slow and data is not recurring at exactly the same periods.

(1) Note. Examples of such systems are teletypewriter and telegraphy.

(2) Note. A signal transmission speed lower than 300 symbols per second may be considered a low speed transmission in the scope of this class.

SEE OR SEARCH CLASS:
178, Telegraphy, appropriate subclass for nonmultiplex asynchronous data systems including a teletypewriter.

299 Data switching exchange:
This subclass is indented under subclass 298. Subject matter including switching of input lines to selected output lines.

300 Data assembly or formatting:
This subclass is indented under subclass 298. Subject matter in which data bytes are grouped or regrouped in particular orders, (e.g., formatting by removal of start or stop bits).

301 Transmitting time of transition and logic state:
This subclass is indented under subclass 298. Subject matter in which a representation of the time elapsed between a previous scan and a data transition from one logic state to another is transmitted along with information about the logic value of the data either before or after the transition.

302 Channels separated in frequency:
This subclass is indented under subclass 298. Subject matter wherein channels of a low speed asynchronous data system are tuned to respective separate frequencies.

SEE OR SEARCH THIS CLASS, SUBCLASS:
295, for a frequency division duplex system.
343+, for combining or distributing information via frequency channels in communication over free space.
480+, for combining or distributing information via frequency channels not limited to carrying low speed asynchronous data.

SEE OR SEARCH CLASS:
334, Tuners, appropriate subclasses for a tuner, per se, that is adjustable to a particular frequency by adjusting the inductance or capacitance of the tuned circuit.
455, Telecommunications, subclasses 150.1+ for radio receiver signal selection based on frequency.

303 Rotary distributor:
This subclass is indented under subclass 298. Subject matter having a signal supply means which rotates for successively connecting lines, stations, instruments (e.g., a sunflower), or having switches which are selectively controlled by a code selection mechanism (e.g., keyboard).

SEE OR SEARCH CLASS:
178, Telegraphy, appropriate subclasses for rotary distributor.

304 Synchronizer:
This subclass is indented under subclass 303. Subject matter having rotary distributors with means for controlling the relationship in phase, frequency, or speed between them.

SEE OR SEARCH THIS CLASS, SUBCLASS:

503+, for a generic multiplex synchronizing device.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclass 395 for a system for synchronizing the rotary motion of a plurality of shafts where adjustable gearing is utilized to control the rotation of at least one of the shafts.

307, Electrical Transmission or Interconnection Systems, subclass 82, 83, and 87 for an electrical system having a plurality of supply circuits or sources of supply with means for controlling the connection or disconnection of the supply circuits or sources by means responsive to the frequency and/or phase relationship between the circuits or sources (the control may involve the control of the speed or angular relation of a generator or converter with respect to another; see subclass 82 where plural rotary converters are involved and subclass 84 where plural generators are involved); and subclass 123 for miscellaneous electrical switching systems where the switching operation is controlled by the differential speed between two bodies.

318, Electricity: Motive Power Systems, subclasses 41+ for plural electric motor systems having electrical synchronizing interconnection for maintaining synchronization between the motors; subclasses 68+ for plural electric motor systems with means for controlling the running speed of one motor relative to the speed of another motor including such systems for maintaining the motors in synchronism; and subclass 85 for the miscellaneous plural electric motor systems with synchronizing or phasing control for the motors.

340, Communications: Electrical, subclasses 870.11+ for a telemetering system having a rotary distributor; subclass 681 for electric alarm which indicate the synchronism or lack of synchronism of a plurality of shafts; and subclass 318 for a miscellaneous signaling system having synchronized distributors at the transmitter and receiver.

341, Coded Data Generation or Conversion, subclass 192 for a code transmitter with a rotary distributor.

352, Optics: Motion Pictures, subclasses 1+ for motion picture apparatus for recording or reproducing a motion picture with sound accompaniment.

368, Horology: Time Measuring Systems or Devices, subclasses 46+ for clock systems which include a master clock and a secondary or receiving clock where the clocks are electrically controlled or operated; subclasses 52+ for the master clock of such a system with its electrical circuits and connections; and subclasses 59+ for the secondary or receiving clock of such a system with their immediate operating mechanism.

375, Pulse or Digital Communications, subclasses 354+ for a nonmultiplexed synchronizer.

416, Fluid Reaction Surfaces (i.e., Impellers), subclass 34 for plural impellers having synchronizing means.

305 Start-Stop:

This subclass is indented under subclass 304. Subject matter in which the synchronizer operates to start or stop the distributors simultaneously.

(1) Note. The distributors (at both ends) after starting usually rotate one complete revolution and one or both are stopped at the initial point.

SEE OR SEARCH CLASS:

178, Telegraphy, subclass 4.1 for a remote controlled automatic printing system.

306 Nonmechanical:

This subclass is indented under subclass 305. Subject matter wherein provision is made for controlling the operation of the distributor by means of a start-stop electronic oscillation generator.

SEE OR SEARCH CLASS:

375, Pulse or Digital Communications, subclass 369 for start-stop synchronization in digital communications not limited to multiplex communications.

307 TRANSMULTIPLEXERS:

This subclass is indented under the class definition. Subject matter in which conversion from one multiplex technique to a different multiplex technique is performed (e.g., conversion between time division multiplex and frequency division multiplex).

SEE OR SEARCH THIS CLASS, SUBCLASS:

478, for combined time division and frequency division multiplexing.

308 RESONANT TRANSFER TECHNIQUES:

This subclass is indented under the class definition. Subject matter wherein a transfer of information samples is achieved by closing access switches to a common bus for a predetermined portion of a cycle of a resonant frequency determined by reactive components associated with each subscriber line.

309 RESONANT TRANSFER SUBSTITUTES:

This subclass is indented under the class definition. Subject matter utilizing techniques that strictly speaking do not utilize resonant transfer but are closely analogous to and are designed as replacements for resonant transfer techniques.

SEE OR SEARCH THIS CLASS, SUBCLASS:

308, for a resonant transfer system.

310 COMMUNICATION OVER FREE SPACE:

This subclass is indented under the class definition. Subject matter wherein multiplex communication signals are transmitted over a medium which is not a wire or a waveguide.

(1) Note. A waveguide may be used in this communication system for other purpose (e.g., for coupling).

SEE OR SEARCH CLASS:

375, Pulse or Digital Communications, appropriate subclass for digital communications not limited to multiplex communications.

398, Optical Communications, subclasses 41 through 42 for duplex optical communication and subclasses 43-103 for multiplex optical communication.

455, Telecommunications, appropriate subclass for nonmultiplex radio communication.

310.1 Using ATM as a wireless protocol:

This subclass is indented under subclass 310. Subject matter wherein fixed length asynchronous transfer mode packets are conveyed over free space.

SEE OR SEARCH THIS CLASS, SUBCLASS:

395.1 through 395.72, for message transmittal using fixed length ATM packets in general, and subclasses 329-337 for generic channel assignment in plural contiguous regions served by respective fixed stations.

SEE OR SEARCH CLASS:

455, Telecommunications, appropriate subclasses for wireless telecommunication.

310.2 Having a plurality of contiguous regions served by respective fixed stations:

This subclass is indented under subclass 310.1. Subject matter wherein plural nonmobile base stations provide service to different geographical areas having their boundaries touch each other on a line or a point.

SEE OR SEARCH THIS CLASS, SUBCLASS:

328 through 338, for generic plural contiguous regions served by respective fixed stations, and subclasses 331-334 for hand-off control in generic plural contiguous regions served by respective fixed stations.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 422.1 through 460 for zoned or cellular radiotelephone system.

311 Signaling for performing battery saving:
This subclass is indented under subclass 310. Subject matter having details of a procedure or supervisory communication used to control a receiver or transceiver so as to conserve power.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclasses 7.32 through 7.38 for a pager including battery conservation in a selective communication system.
455, Telecommunications, subclasses 343.1 through 343.6 for radio receiver battery conservation.

312 Message addressed to multiple destinations:
This subclass is indented under subclass 310. Subject matter wherein a direction for delivery accompanying message information are transmitted to or received by more than one corresponding remote station or group of remote stations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
432, for messages addressed to multiple destinations in wired communications.

313 Portable address responsive receiver:
This subclass is indented under subclass 310. Subject matter wherein a lightweight receiver carried by an individual is selectively communicated to by the use of receiver identification codes.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclasses 7.2 through 7.63 for a pager in a selective communication system.
455, Telecommunications, subclasses 38.1+ for a code responsive radio receiver.

314 Using time division multiplexing:
This subclass is indented under subclass 313. Subject matter in which access to the transmission medium is divided into discrete time intervals, and information from respective channels is transmitted in different time intervals.

315 Repeater:
This subclass is indented under subclass 310. Subject matter having at least a station which retransmits signals of other stations to compensate for attenuation losses or to extend the communication range between a group of stations.

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, subclasses 211+ for a repeater in digital communications.
455, Telecommunications, subclasses 7+ for a carrier wave repeater.

316 Airborne or space satellite repeater:
This subclass is indented under subclass 315. Subject matter wherein a space-deployed station is used as a relay communicating station.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 12.1+ for a space satellite carrier wave repeater.

317 Including noise compensation:
This subclass is indented under subclass 316. Subject matter including a technique to improve the quality of transmitted signals by eliminating unwanted or interfering signals.

318 Including power control:
This subclass is indented under subclass 317. Subject matter wherein noise is compensated by controlling the electrical power or amplitude of the transmitted signal.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 13.4 for space satellite with power control.

319 Multiple access (e.g., FDMA):
This subclass is indented under subclass 316. Subject matter having a scheme for reaching a communication medium in which a station is assigned a channel in response to that station's request for access and the assignment lasting until it is withdrawn.

320 Code division (CDMA):
This subclass is indented under subclass 319. Subject matter wherein spread spectrum codes are allocated to allow multiple signals occupying the same channel bandwidth to be transmitted simultaneously without interfering with one another.

SEE OR SEARCH THIS CLASS, SUBCLASS:
335, for CDMA in cellular wireless communications.
342, for CDMA in general wireless communications.
441, for CDMA in general wire communications.

321 Time division (TDMA):
This subclass is indented under subclass 319. Subject matter in which a station is assigned a vacant time slot channel in a time multiplex frame in response to that station's request for access and the assignment lasting until it is withdrawn.

SEE OR SEARCH THIS CLASS, SUBCLASS:
337, for a wireless communication time division multiple access in a plurality of contiguous regions, each region being served by a respective fixed station.
347, for a general communication over free space using time channel multiple access.
442+, for a general communication over wire using time channel multiple access.

322 Channel reservation scheme:
This subclass is indented under subclass 321. Subject matter including a technique or method for reserving time slots for a multiple access communication.

323 Including onboard switching:
This subclass is indented under subclass 321. Subject matter wherein the airborne or satellite repeater has an apparatus for rearranging the order of the received time slots, comprising a plurality of receiving and transmitting antennas which cover different geographical regions, and wherein received information can be routed to the appropriate transmitting antenna.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 13.3 for a space satellite with antenna feed network or multiple antenna switching.

324 Synchronization:
This subclass is indented under subclass 321. Subject matter including means for insuring that the transmission and reception of time channel multiple access information has a proper time relationship.

SEE OR SEARCH THIS CLASS, SUBCLASS:
350, for synchronization in general time multiplex wireless communications.
503+, for synchronization in general time multiplex communications over wire.

325 Including onboard switching:
This subclass is indented under subclass 319. Subject matter wherein the airborne or satellite repeater has a plurality of receiving and transmitting antennas which cover different geographical regions, and wherein received information can be routed to the appropriate transmitting antenna.

326 Combining or distributing information via time channels:
This subclass is indented under subclass 316. Subject matter wherein information signals are communicated between stations by assembling or separating the signals via different time periods on a common transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
345+, for general communication over free space using time channels.

327 In a trunking system:
This subclass is indented under subclass 315. Subject matter wherein the repeater is used in a system having two or more stations communicate using one channel of a plurality of channels; the channel is assigned based upon the availability of the plurality of channels, and the assignment is controlled by sending supervisory information over a control channel.

(1) Note. The channel assignment for a communication may vary during the communication between the two stations.

(2) Note. The assignment of a channel bearing supervisory information may vary with time, generally daily.

SEE OR SEARCH THIS CLASS, SUBCLASS:
340, for a trunking system which does not include a repeater.

SEE OR SEARCH CLASS:
455, Telecommunications, subclass 11.1 for a mobile repeater.

328 Having a plurality of contiguous regions served by respective fixed stations:
This subclass is indented under subclass 310. Subject matter wherein plural nonmobile base stations provide service to different geographical areas having their boundary touching each other on a line or a point, and wherein communications between mobile units navigating in and out of the areas are regulated by the nonmobile base stations.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 422.1 through 460 for zone or cellular radiotelephone system and subclasses 524-525 for multiple base radio stations system.

329 Channel assignment:
This subclass is indented under subclass 328. Subject matter having details of a process or apparatus for allocating a communication channel to a user or subscriber for transmission of information.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 450+, 464, and 509+ for channel allocation in a cellular radiotelephone system, a private cordless telephone, and radio telecommunications system in general, respectively.

330 Having both time and frequency assignment:
This subclass is indented under subclass 329. Subject matter wherein the allocation of communication channel includes an assignment of a frequency channel and a time channel or time slot.

SEE OR SEARCH THIS CLASS, SUBCLASS:
478, for combined time and frequency division.

331 Hand-off control:
This subclass is indented under subclass 329. Subject matter including means to switch the control of a mobile communication from one geos:graphical area to another geographical area.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 436+ for handoff control in a zoned or cellular radiotelephone system not limited to multiplex communications.

332 Based upon a particular signal quality measurement:
This subclass is indented under subclass 331. Subject matter using a process or apparatus which measures a selected signal characteristic which will serve as a basis for making a determination whether or not to hand-off the mobile station.

333 Signal quality determined by bit error rate:
This subclass is indented under subclass 332. Subject matter wherein the selected signal characteristic is measured by determining a ratio of erroneous bits to the total number of bits communicated at a given time period.

SEE OR SEARCH CLASS:
714, Error Detection/Correction and Fault Detection/Recovery, subclasses 704+ for error rate counting.

334 Using multiple antennas at a station:
This subclass is indented under subclass 332. Subject wherein a station (usually a base station) uses a plurality of directional antennas for transmitting or receiving information, and wherein signals from another station (usually

mobile) are received by two or more of the antennas and the hand-off is performed based upon signal quality measurements received on the two or more antennas.

335 Combining or distributing information via code word channels using multiple access techniques (e.g., CDMA):
This subclass is indented under subclass 329. Subject matter wherein spread spectrum codes are allocated to allow multiple signals occupying the same channel bandwidth to be transmitted simultaneously without interfering with one another.

SEE OR SEARCH THIS CLASS, SUBCLASS:
320, for CDMA in space satellite communications.
342, for CDMA in general wireless communications.
441, for CDMA in general wire communications.

336 Combining or distributing information via time channels:
This subclass is indented under subclass 329. Subject matter wherein information signals are communicated between stations by assembling or separating the signals via different time periods on a common transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
345+, for general communication over free space using time channels.
498+, for general communication over wire using time channels.

337 Multiple access (e.g., TDMA):
This subclass is indented under subclass 336. Subject matter having a scheme for reaching a communication medium in which a station is assigned a vacant time slot channel in a time multiplex frame in response to that station's request for access and the assignment lasting until it is withdrawn.

SEE OR SEARCH THIS CLASS, SUBCLASS:
321+, for time division multiple access in satellite communication.
347, for general communication over free space using time channel multiple access.
442+, for general communication over wire using time channel multiple access.

338 Contiguous regions interconnected by a local area network:
This subclass is indented under subclass 328. Subject matter wherein the base stations in the geographical area communication system are interconnect by a common communication bus, that allows wireless communication devices to communicate with other wireless communication devices or wired communication devices.

(1) Note. The common communication bus typically employs multiple access techniques such as carrier sense multiple access with collision detection (CSMA/CD).

SEE OR SEARCH CLASS:
379, Telephonic Communications, subclasses 59+ for fixed or base stations connected to an exchange by land lines.

339 Plural usage of common antenna:
This subclass is indented under subclass 310. Subject matter in which more than two transmitters or receivers operate from a common antenna.

SEE OR SEARCH THIS CLASS, SUBCLASS:
297, for diplex systems (two transmitters or receivers using a common antenna).

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclasses 100+ for a branched transmission lines network and subclasses 24+ for a coupling network.
375, Pulse or Digital Communications, subclass 257 for a cable system.
455, Telecommunications, subclasses 3.1+ for a distributive analog system.
725, Interactive Video Distribution Systems, subclasses 62 through 153 for video signal transmission which may

use common antenna or cable television.

340 Using trunking:
This subclass is indented under subclass 310. Subject matter wherein two or more stations communicate using one channel of a plurality of channels; the channel is assigned based upon the availability of the plurality of channels, and the assignment is controlled by sending supervisory information over a control channel.

(1) Note. The channel assignment for a communication may vary during the communication between the two stations.

(2) Note. The assignment of a channel bearing supervisory information may vary with time, generally daily.

341 Channel assignment:
This subclass is indented under subclass 340. Subject matter including particular details of apparatus or technique for allocating channels to a communication between two or more stations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
329, for channel assignment in cellular communications.

342 Combining or distributing information via code word channels using multiple access techniques (e.g., CDMA):
This subclass is indented under subclass 310. Subject matter wherein spread spectrum coding techniques allow multiple signals occupying the same channel bandwidth to be transmitted simultaneously without interfering with one another.

SEE OR SEARCH THIS CLASS, SUBCLASS:
320, for CDMA in space satellite communications.
335, for CDMA in cellular wireless communications.
441, for CDMA in general wire communications.

343 Combining or distributing information via frequency channels:
This subclass is indented under subclass 310. Subject matter wherein information signals are communicated between stations by assembling or separating the signals via different frequency bands of a common transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
480+, for communications over wire using frequency channels.

344 Multiple access (e.g., FDMA):
This subclass is indented under subclass 343. Subject matter having a scheme for reaching a comunication medium in which a station is assigned a frequency channel in response to that station's request for access and the assignment lasting until it is withdrawn.

345 Combining or distributing information via time channels:
This subclass is indented under subclass 310. Subject matter wherein information signals are communicated between stations by assembling or separating the signals via different time periods on a common transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
498+, for communications over wire using time channels.

346 Polling:
This subclass is indented under subclass 345. Subject matter in which individual terminals are queried to determine if access to the transmission medium is needed for the transfer of information.

SEE OR SEARCH THIS CLASS, SUBCLASS:
449, for channel assignment by polling in a wired transmission medium.

347 Multiple access (e.g., TDMA):
This subclass is indented under subclass 345. Subject matter having a scheme for reaching a communication medium in which a station is assigned a vacant time slot channel in a time multiplex frame in response to that station's

request for access and the assignment lasting until it is withdrawn.

SEE OR SEARCH THIS CLASS, SUBCLASS:
442+, for communications over wire using time division multiple access.

348 Channel reservation scheme:
This subclass is indented under subclass 347. Subject matter including a technique or method for reserving a time slot for communication.

SEE OR SEARCH THIS CLASS, SUBCLASS:
443, for communications over wire using TDMA with channel reservation scheme.

349 Using messages having an address field as header:
This subclass is indented under subclass 345. Subject matter in which information data is organized in one or more bytes preceded by an identifier indicative of source or destination stations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
389+, for routing a message which includes an address header.

350 Synchronization:
This subclass is indented under subclass 345. Subject matter including means for insuring that the transmission and reception of time multiplex information has a proper time relationship.

SEE OR SEARCH THIS CLASS, SUBCLASS:
324, for synchronization in a TDMA satellite repeater system.
503+, for synchronization in general time multiplex communications over wire.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 502+ for synchronized stations in a nonmultiplex analog communication.

351 PATHFINDING OR ROUTING:
This subclass is indented under the class definition. Subject matter including an apparatus or a technique for locating a path through a switching network from a source to a destination.

(1) Note. This subclass includes techniques for reorganizing existing connections to make room for new connections.

SEE OR SEARCH THIS CLASS, SUBCLASS:
216+, for alternate routing in response to a faulty condition.
248, for testing a connection established through a multiplex network.
254+, for network configuration determination.
431+, for channel assignment techniques.

SEE OR SEARCH CLASS:
359, Optics: Systems (including Communication) and Elements, subclasses 115 through 140 for optical multiplex communication and particularly subclasses 118-121 for optical local area network.
379, Telephonic Communications, subclasses 242+ for switching of a nonmultiplex voice communication system which may use a time division controlling signal.
710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 316 and 317 for a path selecting switch in bus interface architecture.

352 Combined circuit switching and packet switching:
This subclass is indented under subclass 351. Subject matter wherein the switching network has both (a) a switch which establishes a path between a source and destination with the path being held for the duration of the communication, and (b) a switch which routes information based on an address associated with the information data in a channel which is only occupied for a duration of the time required to transmit the information data and the associated address.

SEE OR SEARCH THIS CLASS, SUBCLASS:
357+, for a circuit switch.
389+, for a packet switch.

353 Switching network having common elements to handle both circuit switched traffic and packet switched traffic:
This subclass is indented under subclass 352. Subject matter wherein same structures in a switching network perform routing of both circuit switched and packet switched data.

354 Switching network having separate elements to handle circuit switched traffic and packet switched traffic:
This subclass is indented under subclass 352. Subject matter wherein noncommon structures within a switching network respectively and separately perform routing of circuit switched and packet switched data.

355 Routing packets through a circuit switching network:
This subclass is indented under subclass 352. Subject matter wherein packet switched traffic is adapted so as to be routed through a switching network designed for circuit switched traffic.

356 Routing circuit switched traffic through a packet switching network:
This subclass is indented under subclass 352. Subject matter wherein circuit switched traffic is adapted so as to be routed through a switching network designed for packet switched traffic.

357 Through a circuit switch:
This subclass is indented under subclass 351. Subject matter wherein the switching network establishes a path or channel between two or more terminals and permits the exclusive use of the connection between them until the connection is released.

(1) Note. A switching exchange or a concentrator with multiplex signals are placed in ths subclass.

(2) Note. The distinction between multiplexing and selective or telemetry devices is: in multiplexing, the information is unrestricted as to content, e.g., a teletypewriter which uses an alphabet to transmit unlimited information, whereas in selective or telemetry devices, the information is restricted as to content, e.g., a transducer measuring a single parameter.

SEE OR SEARCH CLASS:
200, Electricity: Circuit Makers and Breakers, subclasses 175+ for an automatic multiple contact selective switch.
307, Electrical Transmission or Interconnection Systems, subclasses 112+ for class appropriate switching system.
327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 365+ for a miscellaneous gating circuit.
335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 108+ for an electromagnetically operated automatic selective switch.
340, Communications: Electrical, subclasses 2.2 through 2.31 for a channel selecting matrix and subclasses 14.1-14.69 for a decoder matrix which are nonmultiplexing.
379, Telephonic Communications, appropriate subclasses relating to a telephonic device, particularly subclass 290 for multiplexed switches and subclasses 242+ for a switch having nonmultiplexed signals to be switched, and subclass 333 for a concentrator.

358 Switching input signals having different aggregate bit rates:
This subclass is indented under subclass 357. Subject matter wherein the established path has different number of information bits flow per unit time.

SEE OR SEARCH THIS CLASS, SUBCLASS:
391, for packet switching with input signals having different aggregate bit rates.

359 Input or output circuit, per se (i.e., line interface):
This subclass is indented under subclass 357. Subject matter having details of a circuit or technique for controlling how information is handled at an entrance or exit of the switch.

SEE OR SEARCH THIS CLASS, SUBCLASS:
419+, for a input or output circuit line interface in a packet switching system.

360 Switching control:
This subclass is indented under subclass 357. Subject matter including procedures, techniques, or apparatus to implement a supervisory function necessary for a proper switching of information from an input of the switching network to an output of the network.

361 Folded network:
This subclass is indented under subclass 360. Subject matter in which an equivalent N-stage switch is achieved with less than N-stage by "folding" back the output of one stage to connect with the input of a preceding stage.

362 Bus switch:
This subclass is indented under subclass 360. Subject matter in which time switching occurs by connecting communication lines to a common line (bus) for a time sufficient to transfer information between the lines (e.g., one time slot).

SEE OR SEARCH CLASS:
710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses 1+ for transferring data from one or more peripherals to one or more computers or digital data processing systems for the latter to process, store, or further transfer or for transferring data from the computers or digital data processing systems to the peripheral.of information processing system.

363 Having details of control storage arrangement:
This subclass is indented under subclass 362. Subject matter which includes a particular method, apparatus, or technique dealing with the storage of supervisory or control information for controlling the switching.

364 Having plural buses:
This subclass is indented under subclass 362. Subject matter having more than one bus line.

365 Separate transmit and receive buses:
This subclass is indented under subclass 364. Subject matter having different buses for sending and for accepting information.

366 Including serial-parallel or parallel-serial conversion for input or output:
This subclass is indented under subclass 360. Subject matter wherein information in a sequential transmission format is changed to a multipath parallel transmission format, or vice versa, at an entrance or exit of the switching system.

367 For distribution to a multiplanar switching network:
This subclass is indented under subclass 366. Subject matter wherein the switching system consists of two or more parallel switching elements such as parallel space switches.

368 Having details of control storage arrangement:
This subclass is indented under subclass 366. Subject matter which includes a particular method, apparatus, or technique dealing with the storage of supervisory or control information for controlling the switching.

369 Having time and space switches:
This subclass is indented under subclass 360. Subject matter in which the switching system is organized to have (a) a time stage which reorganizes the order of time slots and (b) a space stage which switches time slots on incoming lines to a desired outgoing line in either order.

370 Having space switch as intermediate stage (e.g., T-S-T, T-S-S, or S-S-T):
This subclass is indented under subclass 369. Subject matter having a space switch or switches which are not the first or last stages of a circuit switching network (i.e., time-space plus an additional switching stage).

371 Having details of control storage arrangement:
This subclass is indented under subclass 370. Subject matter which includes a particular method, apparatus, or technique dealing with the storage of supervisory or control information for controlling the switching.

372 Having time switch as intermediate stage (e.g., S-T-S or T-T-S):
This subclass is indented under subclass 369. Subject matter having at least a time switch which is not the first or last stages of a circuit switching network.

373 Having supervisory signaling:
This subclass is indented under subclass 369. Subject matter wherein control information is communicated between switches to control the switches.

374 Having details of control storage arrangement:
This subclass is indented under subclass 369. Subject matter which includes a particular method, apparatus, or technique dealing with the storage of supervisory or control information for controlling the switching.

375 Time switch, per se (e.g., T or T-T):
This subclass is indented under subclass 360. Subject matter in which information in time slots of incoming lines is switched to desired destinations only by storing or delaying the information until the desired instant of readout.

376 Time slot interchange, per se:
This subclass is indented under subclass 375. Subject matter having structural details of a device for altering the time sequence of information received in predetermined time intervals.

377 Having supervisory signaling:
This subclass is indented under subclass 375. Subject matter wherein control information is communicated between switches to control the switches.

378 Having details of control storage arrangement:
This subclass is indented under subclass 375. Subject matter which includes a particular method, apparatus, or technique dealing with the storage of supervisory or control information for controlling the switching.

379 Data memory addressing:
This subclass is indented under subclass 378. Subject matter wherein a particular storage control apparatus or technique is utilized to control the writing of incoming data information into a storage device and the reading of data information therefrom for transmission.

380 Space switch, per se (e.g., S or S-S):
This subclass is indented under subclass 360. Subject matter wherein the switching control is for a switching system that has a plurality of inputs and a plurality of outputs wherein any input can be connected to any output for spatially displacing the information.

381 Having details of control storage arrangement:
This subclass is indented under subclass 360. Subject matter which includes a particular method, apparatus, or technique dealing with the storage of supervisory or control information for controlling the switching.

SEE OR SEARCH THIS CLASS, SUBCLASS:

363, for details of control memory in a bus switch.

368, for details of control memory in a switch having serial to parallel conversion or vice versa.

371, and 374, for details of control memory in a combined time and space switching system.

378, for details of control memory in a time switch.

382 Data memory addressing:
This subclass is indented under subclass 381. Subject matter wherein a particular storage control apparatus or technique is utilized to control the writing of incoming data information into a storage device and the reading of data information therefrom for transmission.

383 Control storage addressing:
This subclass is indented under subclass 381. Subject matter wherein a particular apparatus or technique is utilized to control the reading or writing of control information from or to a control memory.

384 Having a supervisory signaling feature:
This subclass is indented under subclass 360. Subject matter wherein control information is communicated between stations for switching control.

SEE OR SEARCH THIS CLASS, SUBCLASS:
496, for signaling in multiplex communications via frequency channels.
522+, for signaling in multiplex communications via time channels.

385 Having a separate signaling network:
This subclass is indented under subclass 384. Subject matter wherein a communication system distinct from the switching system is provided for the communication of signaling information (i.e. CCITT Signaling System No. 7).

SEE OR SEARCH THIS CLASS, SUBCLASS:
524, for a dedicated signaling channel in general communication via time channels.

386 Particular switching network arrangement:
This subclass is indented under subclass 357. Subject matter includes details of a physical arrangement of switching elements in a switching system.

387 Multiplanar switch:
This subclass is indented under subclass 386. Subject matter wherein the switching system consists of two or more parallel switching elements.

388 Multistage switch:
This subclass is indented under subclass 386. Subject matter wherein the switching system consists of two or more sequential switching elements.

389 Switching a message which includes an address header (e.g., packet switching):
This subclass is indented under subclass 351. Subject matter wherein information data to be switched is organized with one or more bytes preceded by an identification information indicative of a source or destination station.

(1) Note. The switching of the message having an address header is commonly called packet switching.

SEE OR SEARCH THIS CLASS, SUBCLASS:
473, and 474, for handling of packet data other than switching.

390 Replicate messages for multiple destination distribution:
This subclass is indented under subclass 389. Subject matter wherein copies of the same information is being made for transferring to more than one destination.

391 Switching input signals having different aggregate bit rates:
This subclass is indented under subclass 389. Subject matter wherein the switch has plural input lines, and information bits per unit time flow in each line are different from one another.

392 Processing of address header for routing, per se:
This subclass is indented under subclass 389. Subject matter having details of techniques or apparatus which process the address information field for switching the packet of information.

393 Address concatenation:
This subclass is indented under subclass 392. Subject matter wherein information concerning the address of nodes or switches in the route of a packet are serially linked together in the packet to provide information for the route of packets.

(1) Note. For example, the packet is transmitted through a plurality of nodes, and the address of all the nodes in the route will be added to the address field of a packet.

394 Sequencing or resequencing of packets to ensure proper output sequence order:
This subclass is indented under subclass 389. Subject matter wherein a rearrangement of packets order is performed before being outputted to ensure that the packets are outputted in the same order as the packets received by the network.

395.1 Message transmitted using fixed length packets (e.g., ATM cells):
This subclass is indented under subclass 389. Subject matter wherein information is conveyed using fixed size packets or protocol data units.

(1) Note. ATM denotes Asynchronous Transfer Mode.

SEE OR SEARCH THIS CLASS, SUBCLASS:
238.1, for ATM least cost routing and subclasses 310.1-310.2 for ATM used as a wireless protocol.

SEE OR SEARCH CLASS:
455, Telecommunications, subclasses 422.1 through 460 for a zoned or cellular telephone system, subclasses 436-444 for hand-off in a zoned or cellular telephone system, subclass 445 for call routing in a zoned or cellular telephone system, subclass 455 for channel seizing in a zoned or cellular telephone system.

395.2 Connection set-up/disconnect (e.g., Connection Admission Control):
This subclass is indented under subclass 395.1. Subject matter including connection negotiation prior to start of packet transmission.

SEE OR SEARCH THIS CLASS, SUBCLASS:
230 through 234, for monitoring of ATM channel parameters in congestion control.

395.21 Based on traffic contract (including using setup messages, QoS, delay/bandwidth requirement):
This subclass is indented under subclass 395.2. Subject matter wherein connection admission control is based upon a particular traffic contract.

(1) Note. A traffic contract consists of a) service category (e.g., CBR (Constant Bit Rate), VBR (Variable Bit Rate), UBR (Unspecified Bit Rate), or ABR (Available Bit Rate)), b) connection traffic/cell rate descriptor (e.g., PCR (Peak Cell Rate), MBS (Maximum Burst Size), or MCR (Minimum Cell Rate)), and c) QoS (Quality of Service) parameters.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.43, for information scheduling which may include service category (e.g., CBR or VBR).

395.3 Connection identifier assignment:
This subclass is indented under subclass 395.1. Subject matter including assigning identification of a connection within a packet header which determines the route to be taken by the packet.

(1) Note. The assignment can be for switched or permanent connections.

SEE OR SEARCH CLASS:
711, Electrical Computers and Digital Processing Systems: Memory, subclasses 203 through 209 for virtual addressing.

395.31 Including routing table:
This subclass is indented under subclass 395.3. Subject matter which utilizes a routing database table.

SEE OR SEARCH CLASS:
379, Telephonic Communications, subclasses 272 through 277 for telephonic centralized switching station routing.
709, Electrical Computers and Data Processing System: Multiple Computer or Process Coordinating, subclasses 238 through 244 for computer-to computer data routing.
711, Electrical Computers and Digital Processing Systems: Memory, subclass 221 for address formation using table.

395.32 Employing particular searching function (e.g., hashing, alternate, re-routing):
This subclass is indented under subclass 395.31. Subject matter wherein the routing table is accessed by a specific lookup technique.

SEE OR SEARCH CLASS:
711, Electrical Computers and Digital Processing Systems: Memory, subclass 216 for address formation hashing.

395.4 Assigning period of time for information to be transmitted (e.g., scheduling):
This subclass is indented under subclass 395.1. Subject matter including determining when to transmit packets into a fixed length packet network.

(1) Note. Scheduling includes the techniques of Round Robin (RR), Weighted Round Robin (WRR), Bandwidth On Demand (BOD), Quality of Service (QoS), and those utilizing delay parameters, etc.

395.41 Based on bandwidth allocation (e.g., Weighted Round Robin):
This subclass is indented under subclass 395.4. Subject matter wherein the time period assignment is dependent on throughput (e.g., cell rate) allocation.

395.42 Based on priority:
This subclass is indented under subclass 395.4. Subject matter wherein the time period assignment is dependent on channel precedence.

395.43 Based on service category (e.g., CBR, VBR, UBR, or ABR):
This subclass is indented under subclass 395.42. Subject matter wherein scheduling is determined by both traffic and quality of service parameters negotiated prior to the setup of a connection.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.21, for connection set-up/disconnect involving traffic contract including CBR, VBR, UBR, or ABR.

395.5 Multiprotocol network:
This subclass is indented under subclass 395.1. Subject matter including conversion of a protocol into a protocol having fixed length packets.

SEE OR SEARCH THIS CLASS, SUBCLASS:
466 through 467 , for adaptive protocol conversion in general.

395.51 Utilizing a plurality of ATM networks (e.g., MPOA, SONET, or SDH):
This subclass is indented under subclass 395.5. Subject matter including multiple networks which convey asynchronous transfer mode packets.

395.52 Internet Protocol (including TCP/IP or UDP/IP) over fixed length packet network (e.g., IP over ATM):
This subclass is indented under subclass 395.5. Subject matter including transmission of OSI layer 3 or layer 4 protocol data into a uniform length packet network.

(1) Note. Details of adaptation are classified elsewhere. See search notes below.

(2) Note. TCP/IP denotes Transmission Control Protocol/Internet Protocol and UDP/IP denotes User Datagram Protocol/Internet Protocol.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.6 through 395.65, for adapting details, subclass 395.65 for adapting details of connectionless protocols such as IP or UDP into fixed length packets, subclasses 465-473 for adaptive communication techniques including conversion between protocols in general, and subclass 474 for assembly or disassembly of messages having address headers.

395.53 Emulated LAN (LANE/ELAN/VLAN, e.g., Ethernet or token ring legacy LAn over a single ATM network/LAN):
This subclass is indented under subclass 395.5. Subject matter which simulates functions and protocols of a traditional/legacy LAN.

(1) Note. LANE, ELAN, VLAN denote LAN Emulation, Emulated LAN, and Virtual LAN, respectively.

395.54 Address resolution (e.g., ARP, or NHRP):
This subclass is indented under subclass 395.5. Subject matter including mapping from one address to another.

(1) Note. This includes mapping of a layer 3 address to a layer 2 address or determining a destination hardware address.

(2) Note. Examples include ARP (Address Resolution Protocol), and NHRP (Next Hop Resolution Protocol).

SEE OR SEARCH THIS CLASS, SUBCLASS:
475, for address transmitted communication techniques in general.

395.6 Adapting detail (e.g., converting to/from ATM, or detail of ATM Adaptation Layers (AALs)):
This subclass is indented under subclass 395.1. Subject matter wherein data is formatted/mapped into fixed length packets or vice versa.

SEE OR SEARCH THIS CLASS, SUBCLASS:
466 through 467, for adaptive protocol conversion in general.

395.61 Adapting constant bit rate (CBR) data (e.g., voice, or narrow band ISDN over ATM, or using AAL1):
This subclass is indented under subclass 395.6. Subject matter wherein data having an unchanging bit rate is formatted/mapped into fixed length packets or vice versa.

(1) Note. Typically, this involves AAL1 format.

(2) Note. Included here are details of adapting connection-oriented, constant bit rate (CBR) or isochronous data, for example, voice data which is transferred on ISDN (Integrated Services Digital Network) lines or details of using AAL1.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.5 through 395.54, for a multiprotocol network.

395.62 Detail of clock recovery or synchronization:
This subclass is indented under subclass 395.61. Subject matter providing specifics of recovery of a timing reference signal or other synchronization.

SEE OR SEARCH THIS CLASS, SUBCLASS:
503 through 520, for time channel synchronization in general.

395.63 Adapting frame relay/X.25 data (e.g., using AAL 3/4):
This subclass is indented under subclass 395.6. Subject matter wherein frame relay/X.25 data is formatted/mapped into fixed length packets or vice versa.

(1) Note. Typically, this involves AAL 3/4 format.

(2) Note. Frame relay and X.25 are particular data types as defined by the International Telecommunications Union Telecommunications.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395.64, for adapting connection-oriented VBR data into fixed length packets, in general.

395.64 Adapting connection-oriented variable bit rate (VBR) data (e.g., MPEG/HDTV packet video/audio over ATM or using AAL2):
This subclass is indented under subclass 395.6. Subject matter wherein connection-oriented data having a changing bit rate is formatted/mapped into fixed length packets or vice versa.

(1) Note. Typically, this involves AAL 2 format.

(2) Note. Connection-oriented communication involves a) establishing a connection, b) data transfer, and c) releasing the connection.

SEE OR SEARCH THIS CLASS, SUBCLASS:

395.5 through 395.54, for a multiprotocol network, subclass 395.63 for adapting frame relay/X.25 into fixed length packets, and subclass 395.65 for adapting connection-less VBR data into fixed length packets.

SEE OR SEARCH CLASS:

725, Interactive Video Distribution Systems, appropriate subclasses for interactive video distribution systems.

395.65 Adapting connectionless variable bit rate (VBR) data (e.g., adapting 802.X, or using AAL5):

This subclass is indented under subclass 395.6. Subject matter wherein connectionless data having a changing bit rate is formatted/mapped into fixed length packets or vice versa.

(1) Note. Typically, this involves AAL5 format.

(2) Note. Included here is adapting traffic which is typically highly bursty, e.g., data from local area networks (LANs).

(3) Note. Connectionless communication is one which takes place without connection establishing.

(4) Note. 802.X is a particular type of connectionless variable bit rate data.

SEE OR SEARCH THIS CLASS, SUBCLASS:

395.5 through 395.54 for a multiprotocol network, subclass 395.52 for a multiprotocol network involving IP over a fixed length packet network, subclass 395.53 for a multiprotocol network which is an emulated LAN, and subclass 395.64 for adapting connection oriented VBR data into fixed length packets.

395.7 Having detail of switch memory reading/writing:

This subclass is indented under subclass 395.1. Subject matter wherein details of reading from or writing to a memory device in a network switch are provided.

SEE OR SEARCH THIS CLASS, SUBCLASS:

412 through 418, for a queuing arrangement in general.

SEE OR SEARCH CLASS:

365, Static Information Storage and Retrieval, subclasses 189.01 through 225.7 for read/write circuits in static information storage and retrieval.

711, Electrical Computers and Digital Processing Systems: Memory, appropriate subclasses and particularly subclass 100 173 for storage accessing and control, and subclass 216 for address formation hashing in general.

395.71 Having input or output storage or both:

This subclass is indented under subclass 395.7. Subject matter including buffers or queues at each switch input or at each switch output or both.

SEE OR SEARCH THIS CLASS, SUBCLASS:

412 through 418, for input or output queuing or both in general.

395.72 Having central (e.g., common) storage:

This subclass is indented under subclass 395.7. Subject matter including a common or singular buffer or queue in the network switch.

396 Distributed switching:

This subclass is indented under subclass 395. Subject matter wherein the routing of a message from a source to a destination is performed by a plurality of nodes which share the control of switching and routing functions of the network.

SEE OR SEARCH THIS CLASS, SUBCLASS:

400+, for non-ATM packet distributed switching.

397 Employing logical addressing for routing (e.g., VP or VC):

This subclass is indented under subclass 396. Subject matter wherein packets of information are communicated between two or more sta-

tions on physical paths or circuits which may vary with time during a connection, and are identified using a transparent addressing scheme.

(1) Note. The time varying paths or circuits are also called virtual paths (VP) or virtual circuits (VC).

SEE OR SEARCH THIS CLASS, SUBCLASS:

399, for employing logical addressing for routing in ATM centralized switching.

409, for employing logical addressing for routing in non-ATM distributed switching.

398 Centralized switching:

This subclass is indented under subclass 395. Subject matter wherein the switching network consists of one switch node with a plurality of inputs and a plurality of outputs.

SEE OR SEARCH THIS CLASS, SUBCLASS:

422+, for non-ATM packet centralized switching.

399 Employing logical addressing for routing (e.g., VP or VC):

This subclass is indented under subclass 398. Subject matter wherein packets of information are communicated between two or more stations on physical paths or circuits which may vary with time during a connection, and are identified using a transparent addressing scheme.

400 Having a plurality of nodes performing distributed switching:

This subclass is indented under subclass 389. Subject matter having a switching architecture in which a plurality of switch nodes are provided such that the switching function is spread out over a geos:graphical area.

SEE OR SEARCH THIS CLASS, SUBCLASS:

396+, for ATM distributed switching.

401 Bridge or gateway between networks:

This subclass is indented under subclass 400. Subject matter having a device for interconnecting two or more networks at a media-access level of a data-link layer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

402, for a bridge which interconnects two or more bus networks wherein the buses have a plurality of terminals connected thereto.

404, for a bridge which interconnects two or more closed transmission path network having a plurality of terminals connected thereto.

402 Bridge between bus systems:

This subclass is indented under subclass 401. Subject matter wherein networks interconnected by the bridge are characterized by having a common transmission line with a plurality of terminals connected thereto.

403 At least one bus is a ring network:

This subclass is indented under subclass 402. Subject matter wherein at least one of the bus systems is a closed loop transmission bus.

404 Ring or loop forms backbone for interconnecting other networks:

This subclass is indented under subclass 403. Subject matter wherein a closed path transmission system serves as a central switch for switching information to and from other networks.

405 The other networks are ring or loop networks:

This subclass is indented under subclass 404. Subject matter wherein the backboned ring or loop interconnects other closed transmission line networks having a plurality of terminals connected thereto.

406 Plurality rings or loops to form a mesh network:

This subclass is indented under subclass 400. Subject matter having a plurality of nodes wherein each node is connected to at least two closed transmission path communication links.

407 Interconnected star couplers:
This subclass is indented under subclass 400. Subject matter having interconnection between plural couplers that distributes signal from one or more transmission line input among a larger number of output lines.

408 Nodes interconnected in a hierarchy to form a tree:
This subclass is indented under subclass 400. Subject matter having a plurality of nodes wherein one of the nodes is a root node and other nodes are connected to the root node by branches.

409 Employing logical addressing for routing (e.g., VP or VC):
This subclass is indented under subclass 400. Subject matter wherein packets of information are communicated between two or more stations on physical paths which are varying with time during a connection, and are identified using a transparent addressing scheme.

410 Having a signaling feature:
This subclass is indented under subclass 400. Subject matter wherein supervisory information is communicated between switches to control the switches.

411 Including sorting and merging networks:
This subclass is indented under subclass 389. Subject matter wherein pathfinding through a self routing packet switch includes (a) Batcher and (b) Banyan type networks.

412 Queuing arrangement:
This subclass is indented under subclass 389. Subject matter wherein pathfinding through a packet switch involves a particular buffer processing arrangement for control of communication of packets in a packet network.

413 Having both input and output queuing:
This subclass is indented under subclass 412. Subject matter having a queuing arrangement at both the input and output of the packet switch.

414 Contention resolution for output:
This subclass is indented under subclass 413. Subject matter having a particular protocol to resolve the problem of unregulated bidding for an output line by multiple messages from different inputs.

415 Having input queuing only:
This subclass is indented under subclass 412. Subject matter having queues exclusively on inputs to the network.

416 Contention resolution for output:
This subclass is indented under subclass 415. Subject matter having a particular protocol to resolve the problem of unregulated bidding for an output line by multiple messages from different inputs.

417 Having output queuing only:
This subclass is indented under subclass 412. Subject matter having queues exclusively on outputs of the network.

418 Contention resolution for output:
This subclass is indented under subclass 417. Subject matter having a particular protocol to resolve the problem of unregulated bidding for an output line by multiple messages from different inputs.

419 Input or output circuit, per se (i.e., line interface):
This subclass is indented under subclass 389. Subject matter having means or techniques for controlling how information is handled at an input or output of a switch.

420 For connecting plural subscribers to a network (i.e., network termination):
This subclass is indented under subclass 419. Subject matter wherein the input or output circuit interfaces more than one terminal to a transmission line network.

421 Subscribers connected to an input or output circuit by a common bus:
This subclass is indented under subclass 420. Subject matter wherein the terminals to be connected to a transmission line network by an interface are interconnected to the interface by a common transmission line.

422 Centralized switching:
This subclass is indented under subclass 389. Subject matter having one single switch node for switching packet type information from a

plurality of inputs to a plurality of outputs of the node.

SEE OR SEARCH THIS CLASS, SUBCLASS:
398+, for ATM centralized switching.

423 Including a bus for interconnecting inputs and outputs:
This subclass is indented under subclass 422. Subject matter including a closed path for interconnecting input interfaces and output interfaces of a packet type switch.

424 Including a ring or loop for interconnecting inputs and outputs:
This subclass is indented under subclass 423. Subject matter including a closed path for interconnecting input interfaces and output interfaces of a packet type switch.

425 Star configuration:
This subclass is indented under subclass 422. Subject matter wherein a data distribution system containing a central node or hub connected to one end of each of three or more branches and each other end of the branches is connected to a member of a local area network multiplex system, and all routing of network data takes place through the central node.

426 Having a signaling feature:
This subclass is indented under subclass 422. Subject matter wherein supervisory information is communicated between switches to control the switches.

427 Space switching:
This subclass is indented under subclass 389. Subject matter wherein messages are transferred from inputs to outputs of a switch node by temporarily providing a physical path between the inputs and outputs in order to route the messages.

428 Store and forward:
This subclass is indented under subclass 351. Subject matter including facilities which permit (a) a storage of all or part of a message when no outgoing link to a destination is free and (b) a subsequent transmission to the destination when such a link becomes free.

429 Particular storing and queuing arrangement:
This subclass is indented under subclass 428. Subject matter having a particular buffer processing arrangement for controlling the flow of information.

430 FDM switching:
This subclass is indented under subclass 351. Subject matter wherein signals to be switched are frequency division multiplexed in the transmission medium having a frequency spectrum divided into segments and respective information channels are transmitted in different segments.

431 CHANNEL ASSIGNMENT TECHNIQUES:
This subclass is indented under the class definition. Subject matter having details of a technique for allocating usage of a communication channel or channels to subscriber terminals.

SEE OR SEARCH THIS CLASS, SUBCLASS:
329+, for channel assignment in a communication over free space with a plurality of contiguous regions served by respective fixed stations.
341, for channel assignment in radio trunking communication.

432 Messages addressed to multiple destinations:
This subclass is indented under subclass 431. Subject matter wherein a direction for delivery accompanying message information are transmitted to or received by more than one corresponding remote station or group of remote stations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
312, for messages addressed to multiple destinations in wireless communications.

433 Only active channels transmitted:
This subclass is indented under subclass 431. Subject matter wherein the system adapts to changing traffic conditions by sending only data from active channels and by suppressing data from inactive channels.

434 Concentrator:
This subclass is indented under subclass 433. Subject matter in which a switching device is used to reduce the number of transmission channels required to serve remote stations by allocating a transmission channel to a remote station only when the remote station requests service (e.g., by going off hook).

435 TASI (Time Assignment Speech Interpolation):
This subclass is indented under subclass 434. Subject matter including telephone switching equipment whereby a user's line is connected to an idle line when he starts talking and is disconnected when he stops talking.

SEE OR SEARCH CLASS:
381, Electrical Audio Signal Processing Systems and Devices, subclasses 41+ for speech analysis.

436 Combined time and frequency assignment:
This subclass is indented under subclass 431. Subject matter wherein the assignment of a communication channel includes assignment of a frequency channel and a time channel or time slot.

437 Adaptive selection of channel assignment technique:
This subclass is indented under subclass 431. Subject matter having an automatic selection of a technique that provides an optimum channel assignment performance.

438 Using a separate control line or bus for access control:
This subclass is indented under subclass 431. Subject matter wherein the assignment of a channel is controlled by a supervisory signal communicated on a line which is distinct from the line used for communicating information signals.

439 Control line is used to request or reserve access:
This subclass is indented under subclass 438. Subject matter wherein the control line is used by a station to send a demand for having a channel assigned or for using a communication line.

440 Dual bus dynamic queuing (i.e., DQDB):
This subclass is indented under subclass 439. Subject matter wherein a first bus carries information in time slots and a second bus carries time slot reservation and request signal for controlling access of information in the time slot of the first bus.

(1) Note. DQDB stands for distributed queue dual bus.

441 Combining or distributing information via code word channels using multiple access techniques (e.g., CDMA):
This subclass is indented under subclass 431. Subject matter wherein spread spectrum coding techniques allow multiple signals occupying the same channel bandwidth to be transmitted simultaneously without interfering with one another.

SEE OR SEARCH THIS CLASS, SUBCLASS:
320, for CDMA in space satellite communications.
335, for CDMA in cellular wireless communications.
342, for CDMA in general wireless communications.

442 Combining or distributing information via time channels using multiple access techniques (e.g.,TDMA):
This subclass is indented under subclass 431. Subject matter having a scheme for reaching a communication medium in which a station is assigned a vacant time slot channel in response to that station's request for access and the assignment lasting until it is withdrawn.

SEE OR SEARCH THIS CLASS, SUBCLASS:
321+, for TDMA in space satellite communications.
337, for TDMA in cellular wireless communications.
347, for TDMA in general wireless communications.

443 Using channel reservation:
This subclass is indented under subclass 442. Subject matter wherein a specific time slot channel is exclusively reserved to a certain station to access the communication media.

444 With priority resolution:
This subclass is indented under subclass 443. Subject matter wherein the access to a reserved channel is based on an order of importance assigned to each station.

(1) Note. The permitted transmission may be for the first actuated transmitter, or for a transmitter given priority in accordance with a program, a condition, or time.

445 Carrier sense multiple access (CSMA):
This subclass is indented under subclass 431. Subject matter having a reservation scheme for reaching a communication medium in which a station is assigned a carrier; the idle state of a communication channel is determined by sensing the presence or absence of a carrier signal on the channel.

(1) Note. CSMA with collision detection (CSMA/CD) or a listen while talk scheme (LWT) is the basis of the Ethernet protocol. In this scheme, a user listens to a channel while sending out a message and immediately ceases transmission before it is completed when a collision with another simultaneous transmitting user is detected.

446 Using a star coupler:
This subclass is indented under subclass 445. Subject matter wherein a passive coupler distributes information signals from one or more input lines among a larger number of output lines.

447 Arbitration for access between contending stations:
This subclass is indented under subclass 445. Subject matter wherein an order of importance is assigned to stations or information to resolve situations in which plural stations attempt to gain access to the same communication channel at the same time.

448 Using weighted back-off timing:
This subclass is indented under subclass 447. Subject matter wherein after a data collision is detected, the stations which caused the collision vary the amount of time before an attempt to transmit again according to a priority scheme.

449 Polling:
This subclass is indented under subclass 431. Subject matter in which individual terminals are queried to determine if access to the transmission medium is needed for the transfer of information.

SEE OR SEARCH THIS CLASS, SUBCLASS:
346, for polling in wireless communications.

450 Passing a signal identifying the idle or busy state of a channel (e.g., token passing):
This subclass is indented under subclass 449. Subject matter in which a signal indicative of an occupancy or nonoccupancy state of a communication channel is sent to control access to the communication channel.

(1) Note. The signal identifying the idle or busy state of a channel is also called the token.

451 On bus:
This subclass is indented under subclass 450. Subject matter in which the idle or busy signal is passing on a common trunk line to which a number of terminals can be connected through couplers.

452 On ring or loop:
This subclass is indented under subclass 451. Subject matter in which the idle or busy signal is passed from station to station on a closed transmission path.

(1) Note. Token passing buses are normally implemented by the creation of a logical loop or ring using a token passing list which contains the order of which token is to be passed.

453 Initialization or reinitialization of network:
This subclass is indented under subclass 452. Subject matter having means for (a) starting or (b) resetting a communication network.

454 Having multiple idle or busy signals simultaneously on the network:
This subclass is indented under subclass 452. Subject matter wherein more than one idle or busy signal is present on the loop or ring since multiple frames of information which contain the signals are present on the loop or ring at the same time.

455 Including priority resolution:
This subclass is indented under subclass 452. Subject matter wherein an order of importance is assigned to stations or information to resolve situations in which plural stations attempt to gain access to the same communication channel at the same time.

456 Idle or busy signal erasure or frame erasure:
This subclass is indented under subclass 452. Subject matter involving the suppression or elimination of an idle or busy signal to ensure that a proper idle or busy signal is on the loop or ring.

457 Initialization or reinitialization of network:
This subclass is indented under subclass 450. Subject matter having means for (a) starting or (b) resetting a communication network.

458 Using time slots:
This subclass is indented under subclass 431. Subject matter wherein access to a transmission medium is performed by using an assigned time period.

459 Having indication of idle or busy state of time slot:
This subclass is indented under subclass 458. Subject matter wherein a time slot is assigned based on a test indicating an occupancy or non-occupancy state of the network.

460 On ring or loop network:
This subclass is indented under subclass 459. Subject matter wherein the indication of idle or busy state of a time slot is applied to a ring or loop network.

461 Arbitration for access between contending stations:
This subclass is indented under subclass 458. Subject matter including techniques or apparatus to resolve the right of a terminal to use a time slot channel when two or more terminals desire to use the channel simultaneously.

462 Arbitration for access to a channel:
This subclass is indented under subclass 431. Subject matter including techniques or apparatus to resolve the right of a terminal to use a common communication channel when two or more terminals desire to use the channel simultaneously.

SEE OR SEARCH THIS CLASS, SUBCLASS:
444, for TDMA with priority channel reservation.
447, for CSMA with arbitration for access between contending stations.
461, for arbitration for access using time slots.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclasses 825.5+ for priority in selective system in general.

463 Details of circuit or interface for connecting user to the network:
This subclass is indented under subclass 431. Subject matter having means or techniques for handling the transfer of information from one or more terminal to the transmission line network.

SEE OR SEARCH THIS CLASS, SUBCLASS:
359, for line interface input or output circuit, per se, in a circuit switch system.
419+, for line interface input or output circuit, per se, in a packet switch system.

464 COMMUNICATION TECHNIQUES FOR INFORMATION CARRIED IN PLURAL CHANNELS:
This subclass is indented under the class definition. Subject matter including details of methods or apparatus for formatting, converting, combining, or distributing information signals

for transmission or reception via more than one time or frequency channel.

SEE OR SEARCH THIS CLASS, SUBCLASS:

280, and 294, for time division duplex system.

281, and 295, for frequency division duplex system.

298+, for low speed asynchronous system which may include techniques for data formatting, or techniques for combining or distributing information via channels separated in frequency or in time.

310+, for communication over free space wherein information may be combined or distributed via channels separated in frequency or in time.

465 Adaptive:
This subclass is indented under subclass 464. Subject matter in which the transmission format changes or adapts automatically, or is programmed for changing traffic requirements, or accommodates a plurality of sources having diverse characteristics, (e.g., rates or data format).

466 Converting between protocols:
This subclass is indented under subclass 465. Subject matter including means for converting format and timing of message exchanges between two systems governed by different set of communicating rules.

467 Conversion between signaling protocols:
This subclass is indented under subclass 466. Subject matter including means for converting format and timing of control or supervisory information exchanges between two systems governed by different set of communicating rules.

468 Assignment of variable bandwidth or time period for transmission or reception:
This subclass is indented under subclass 465. Subject matter including adaptive allocations of different frequency bandwidths or different time period durations for a transmission or reception.

SEE OR SEARCH THIS CLASS, SUBCLASS:

477, for transmission bandwidth conservation.

469 Processing multiple layer protocols:
This subclass is indented under subclass 465. Subject matter including adaptive processing of information which is compliant with rules as set forth in a tiered (layered) structured communication.

(1) Note. An example of a multiple layer network is the Open System Interconnection (OSI) Reference Model which comprises seven layers respectively named: Physical, Data Link, Network, Transport, Session, Presentation and Application. Each layer assumes an independent function which could be individually modified without destabilizing the entire system protocols.

470 Frame length:
This subclass is indented under subclass 465. Subject matter having varying time period to transmit a recurring number of data bits along with control information.

471 Message having an address header:
This subclass is indented under subclass 470. Subject matter in which information data is organized in one or more bytes preceded by an identifier indicative of source or destination stations.

472 Byte length:
This subclass is indented under subclass 465. Subject matter wherein byte lengths adapt to changes in traffic conditions.

(1) Note. A byte is a digital word comprised of a group of related pulses.

473 Transmission of a single message having multiple packets:
This subclass is indented under subclass 465. Subject matter wherein the system adapts to transmit only a single message formed by plural packets.

474 Assembly or disassembly of messages having address headers:
This subclass is indented under subclass 464. Subject matter including (a) a process of combining into a collective unit plural messages having each an address header, or (b) a process of decombining a collective unit of messages.

475 Address transmitted:
This subclass is indented under subclass 464. Subject matter in which identifying information indicative of the receiving or transmitting station accompanies the data transmission.

476 Byte assembly and formatting:
This subclass is indented under subclass 464. Subject matter in which received data is grouped into a predefined order (format) either with or without a format conversion.

477 Transmission bandwidth conservation:
This subclass is indented under subclass 464. Subject matter having means for accommodating more information per unit time on a given transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
468, for adaptive assignment of variable bandwidth or time period for transmission or reception.

SEE OR SEARCH CLASS:
348, Television, subclasses 384.1 through 440.1 for video bandwidth reduction.
375, Pulse or Digital Communications, subclasses 240.01 through 240.29 for digital television bandwidth compression system.
381, Electrical Audio Signal Processing Systems and Devices, subclasses 29+ for audio bandwidth compression or expansion.

478 Combined time division and frequency division:
This subclass is indented under subclass 464. Subject matter wherein information signals are combined or distributed via both time and frequency channels.

SEE OR SEARCH THIS CLASS, SUBCLASS:
330, for channel assignment having both time and frequency in communication over free space.
436, for channel assignment having both time and frequency.

479 Combining or distributing information via code word channels:
This subclass is indented under subclass 464. Subject matter in which each multiplexed channel consists of a unique code word which carries the information.

(1) Note. Separation of each multiplexed channel is usually achieved by correlation detection.

(2) Note. PCM or pulse code modulation, which is a particular technique for transmitting digital signal, should not be classified in this subclass if its use is not to make a channel distinct in multiplex communications.

(3) Note. A synchronizing word which may use a particular coding sequence for synchronization purpose is classified in subclasses 503+.

SEE OR SEARCH CLASS:
375, Pulse or Communications, subclasses 130 through 153 for spread spectrum having nonmultiplex code word communication.

480 Combining or distributing information via frequency channels:
This subclass is indented under subclass 464. Subject matter wherein information signals are communicated between stations by assembling or separating the signals via different frequency bands on a common transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
281, and 295, for a frequency division duplex system.
302, for a low speed asynchronous system using frequency channels.

343, for multiplex communication over free space via frequency channels

481 Multiple frequency translations:
This subclass is indented under subclass 480. Subject matter wherein a group of signals occupying a definite frequency band is transferred from one position in the frequency spectrum to another in such a way that the arithmetic frequency difference of signals within the band is unaltered.

482 Particular carrier generation:
This subclass is indented under subclass 480. Subject matter including features specific to a generation of a basic frequency wave (carrier wave); such basic wave is modulated by an information bearing signal (modulating signal) in a modulation process.

483 Using angle modulation:
This subclass is indented under subclass 480. Subject matter using a modulation in which an angle of a sine wave carrier is a characteristic varied from its normal value by modulation.

(1) Note. Phase and frequency modulation are particular forms of angle modulation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
215, for phase modulation.

484 Digital analysis or synthesis of a group:
This subclass is indented under subclass 480. Subject matter in which a frequency multiplex composite spectrum is produced or resolved into its constituent channels by digital processing techniques (e.g., digital filters).

SEE OR SEARCH CLASS:
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 300+ for a digital filter.

485 Subscriber carrier:
This subclass is indented under subclass 480. Subject matter in which an additional individual subscriber service is provided by adding a carrier channel to an existing communication line.

SEE OR SEARCH CLASS:
340, Communications: Electrical, subclasses 870.18+ for a telemetric carrier signaling system; and subclasses 310.01+ for a signal over a power line.
455, Telecommunications, subclasses 400+ for a super audible telephone carrier system where a super audible carrier wave for transmission of telephone signals is transmitted over an electrical system other than a baseband telephone line.

486 Program distribution:
This subclass is indented under subclass 485. Subject matter wherein scheduled information is distributed over a carrier system (e.g., commercial wired radio broadcast).

SEE OR SEARCH THIS CLASS, SUBCLASS:
312, for message addressed to multiple destinations.
339, for plural transmitters/receivers operating off of a common antenna.

SEE OR SEARCH CLASS:
381, Electrical Audio Signal Processing Systems and Devices, subclasses 77+ for one-way program distribution.
455, Telecommunications, subclasses 3.1+ for a analog signal distribution system.
725, Interactive Video Distribution Systems, for appropriate subclasses.

487 Combined communication of diverse information types:
This subclass is indented under subclass 486. Subject matter wherein the program distribution includes plural types of communication media.

488 Connecting filters:
This subclass is indented under subclass 485. Subject matter in which a arrangement of filters or filtering techniques are employed for signal combination or separation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
484, for digital filtering used in a carrier system.

SEE OR SEARCH CLASS:
333, Wave Transmission Lines and Networks, subclasses 100+ and 165 through 167 for coupling networks utilized in a manner similar to networks classified here.

489 Bus (distributed stations):
This subclass is indented under subclass 480. Subject matter in which information is transferred over one or more common frequency channel shared by a plurality of stations having the same level of control.

SEE OR SEARCH THIS CLASS, SUBCLASS:
485, for a telephone subscriber carrier system.

490 Combined communication of diverse information types:
This subclass is indented under subclass 489. Subject matter wherein distributed information includes plural types of communication media.

491 Pilot:
This subclass is indented under subclass 480. Subject matter in which at least one signal wave, usually a single frequency, is transmitted for control purposes, e.g., A.G.C., Doppler correction.

SEE OR SEARCH THIS CLASS, SUBCLASS:
500, for pilot control signal in multiplex communications over time channels.

SEE OR SEARCH CLASS:
381, Electrical Audio Signal Processing Systems and Devices, subclasses 1+ for a stereo system with pilot signals.

492 Repeater:
This subclass is indented under subclass 480. Subject matter having a retransmitting station between communicating stations to compensate for transmission attenuation losses or to extend the range of communication between a group of stations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
274, for a quadruplex repeater.
279, and 293, for a duplex repeater.
315+, for a repeater used in communication over free space.
501, for a repeater used in multiplex communications over time channels.

SEE OR SEARCH CLASS:
178, Telegraphy, subclass 70R+ for a telegraphic nonmultiplex repeater.
330, Amplifiers, for an amplifier which may be used as a repeater.
379, Telephonic Communications, subclasses 338+ for a telephonic nonmultiplex repeater.
455, Telecommunications, subclass 23 for a nonmultiplex frequency carrier wave repeater system.

493 Combined voice and data transmission:
This subclass is indented under subclass 480. Subject matter having transmission of a composite signal comprising audio and data.

494 Data over voice:
This subclass is indented under subclass 493. Subject matter wherein data are transmitted on a carrier frequency higher than the voice frequency range.

495 Data under voice:
This subclass is indented under subclass 493. Subject matter wherein data are transmitted on a carrier frequency lower than the voice frequency range.

496 Signaling:
This subclass is indented under subclass 480. Subject matter including means for transmitting supervisory or indicating information ancillary to principal information being transmitted (e.g., E and M signaling).

SEE OR SEARCH THIS CLASS, SUBCLASS:
522, for signaling in multiplex communications over time channels.

497 Using particular filtering technique:
This subclass is indented under subclass 480. Subject matter employing devices that allow signals of certain frequencies to pass for signal combination or separation.

498 Combining or distributing information via time channels:
This subclass is indented under subclass 464. Subject matter wherein information signals are communicated between stations by assembling or separating the signals via different time periods on a common transmission medium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
280, and 294, for a time division duplex system.
326+, 336+ and 345+, for combining or distributing information via time channels in satellite, cellular, or general communication over free space respectively.
478, for combined time and frequency division multiplexing.

499 Polarity multiplex:
This subclass is indented under subclass 498. Subject matter in which positive and negative half cycles of a carrier wave are respectively modulated independently by signals from different sources.

SEE OR SEARCH CLASS:
381, Electric Audio Signal Processing Systems and Devices, subclasses 2+ for broadcast or multiplex stereo which may include polarity multiplex technique.

500 Pilot:
This subclass is indented under subclass 498. Subject matter including a signal (pilot) separable from the usual information transmitted, which signal is utilized for control, maintenance, or improvement of signal quality.

SEE OR SEARCH THIS CLASS, SUBCLASS:
491, for pilot control signal in multiplex communications over frequency channels.

501 Repeater:
This subclass is indented under subclass 498. Subject matter having a retransmitting station between communicating stations to compensate for transmission attenuation losses or to extend the range of communication between a group of stations.

SEE OR SEARCH THIS CLASS, SUBCLASS:
274, for a quadruplex repeater.
279, and 293, for radio and wire duplex repeater respectively.
315+, for a repeater used in communication over free space.
491, for a repeater used in multiplex communications over frequency channels.

502 Bus extenders:
This subclass is indented under subclass 501. Subject matter including at least a common retransmission line to extend the communication range between a group of transmission lines.

503 Synchronizing:
This subclass is indented under subclass 498. Subject matter including a means for insuring that the transmission and reception of time multiplex information has a proper time relationship.

(1) Note. Included herein is a phase locked loop synchronizer unique to multiplex and a system analogous to pulse stuffing or deletion which utilize a guard interval but do not stuff or delete, but rather adjust timing to prevent conflict.

SEE OR SEARCH THIS CLASS, SUBCLASS:
304, for a synchronizer in a low speed asynchronous data system.

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, subclasses 354+ for synchronizing the operations of receiving and transmitting mechanisms.

504 Reference indication consists of a gap:
This subclass is indented under subclass 503. Subject matter in which synchronization is achieved by identifying the absence of data transmission for a predetermined interval (i.e., a gap) and using that absence to identify a reference point within a transmission interval.

505 Pulse stuffing or deletion:
This subclass is indented under subclass 503. Subject matter wherein synchronization of a pulse train is achieved by (a) inserting extra pulses into the train when pulses arrive too slow or (b) removing pulses from the train when pulses arrive too fast.

506 Frame or bit stream justification:
This subclass is indented under subclass 505. Subject matter wherein a course of action is taken if a receiver station ignores a block of data because an error has occurred or the receiver possesses no more buffer space.

507 Mutual (reciprocal) synchronization:
This subclass is indented under subclass 503. Subject matter wherein the clock frequency adjustment of one station is based upon information about the status of clock signals originating at other stations of the system.

508 Transmission time into time slots adjusted based upon propagation delay time:
This subclass is indented under subclass 507. Subject matter including means to adjust the time at which a station transmits information into an assigned time period in order to compensate for transmission delays which are related to the length and type of communication media.

509 Using synchronization information contained in a frame:
This subclass is indented under subclass 503. Subject matter in which the synchronization is performed on a cycle of a recurring number of data bits (frame) rather than on the individual channels or bits in the frame.

510 Synchronization information is distributed over multiple frames:
This subclass is indented under subclass 509. Subject matter wherein the information used for synchronizing the information stream is placed in multiple time locations within a time period defining more than one frame.

511 Using redundant synchronization words:
This subclass is indented under subclass 510. Subject matter wherein plural identical synchronizing words are transmitted so that the words may be compared to ensure the proper recognition of the synchronizing words.

512 Synchronization information is distributed within a frame:
This subclass is indented under subclass 509. Subject matter wherein the information used for synchronizing the information stream is placed in multiple time locations within the time period defining the frame.

513 Plural synchronization words:
This subclass is indented under subclass 512. Subject matter wherein the information used to synchronize the information stream consists of a multiplicity of multibit words which are distributed in the frame.

514 Unique synchronization word or unique bit sequence:
This subclass is indented under subclass 509. Subject matter wherein a particular sequence of bits is utilized to ensure the proper recognition of the synchronizing information so that the information may be properly decoded.

515 Pseudo-random:
This subclass is indented under subclass 514. Subject matter in which a maximal or minimum length binary sequence is utilized for achieving synchronization.

SEE OR SEARCH THIS CLASS, SUBCLASS:
510, for a pseudo-random sequence distributed over a plurality of frames.

516 Adjusting for phase or jitter:
This subclass is indented under subclass 503. Subject matter including means to correct errors in the time of occurrence of transmitted pulses.

(1) Note. This includes self clocking in which phase lock loops are used to correct phase errors between a local refer-

ence and the received signal for proper synchronization.

517 Including delay device:
This subclass is indented under subclass 516. Subject matter in which the timing of transmission or reception is determined by propagation of one or more pulses down a delay device.

518 Provide plural phases of a clocking signal:
This subclass is indented under subclass 517. Subject matter wherein multiple versions of a clock signal are provided, and wherein each of the clock signals are phase shifted in relation to each other.

519 Delay based upon propagation delay time:
This subclass is indented under subclass 517. Subject matter including a measurement of time required for a pulse or a level transition to propagate through a device.

520 Unique synchronization pulse:
This subclass is indented under subclass 503. Subject matter in which a synchronization bit has a width, amplitude, phase, or other property which serves to distinguish the synchronization bit from data bits.

521 Time compression or expansion:
This subclass is indented under subclass 498. Subject matter where (a) information is read out at a faster rate than it is stored, resulting in a time compression, or conversely (b) where it is stored at a faster rate than it is read out, resulting in a time expansion.

SEE OR SEARCH CLASS:
381, Electrical Audio Signal Processing Systems and Devices, subclasses 34+ for the time compression or expansion of an electrical audio signal.

522 Signaling (ancillary to main information):
This subclass is indented under subclass 498. Subject matter having means for transmitting or detecting signaling information ancillary to the principal information transmitted by the system (e.g., dial pulse, onhook/offhook, and ringing information all ancillary to the information conveyed by a telephone call).

SEE OR SEARCH THIS CLASS, SUBCLASS:
496, for signaling in multiplex communications over frequency channels.

523 Using bit robbing:
This subclass is indented under subclass 522. Subject matter wherein a bit which is normally used to convey main information is temporarily used for supervisory information. (e.g., the 8th bit of a byte of information is temporarily used for signaling).

524 Using a dedicated signaling channel (i.e., D-channel):
This subclass is indented under subclass 522. Subject matter wherein a predefined transmission channel is designated for signaling.

525 Digital tone signal generation:
This subclass is indented under subclass 522. Subject matter including a generator which creates an encoded binary signal representation of a tone or a wave signal.

526 Digital tone detection:
This subclass is indented under subclass 522. Subject matter including a detector of digital tone or digital wave signals.

527 Superimposed or modulated on principal information:
This subclass is indented under subclass 522. Subject matter in which the signaling information is carried on the principal information.

528 Inserted in gaps in main information:
This subclass is indented under subclass 522. Subject matter in which gaps in the principal information transmitted are used for the transmission of ancillary data (e.g., signaling data transmitted during gaps in a speech signal).

SEE OR SEARCH THIS CLASS, SUBCLASS:
433+, for information from a different source inserted in gaps occurred in the principle information, particularly subclass 435 for time assignment speech interpolation.

529 Information superimposed on other information:
This subclass is indented under subclass 498. Subject matter in which the signaling information is carried on information other than the principal information.

530 Staircase wave:
This subclass is indented under subclass 498. Subject matter in which a step wave is used for control purposes.

(1) Note. An example is activating a plurality of gates sequentially.

531 Magnetic core for switching or storage:
This subclass is indented under subclass 498. Subject matter in which magnetic cores are used for switching or storage of multiplexed data.

SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclasses 401+ for a saturable reactor system which uses a magnetic core.
365, Static Information Storage and Retrieval, appropriate subclasses for magnetic core memory.

532 Multiplexer or distributor and technique for handling low level input signal:
This subclass is indented under subclass 498. Subject matter directed to (a) a scanning or sampling switch (multiplexer) operating above the Nyquist rate, or to (b) a demultiplexer or desampling switch (distributor) so operating, and including a means for improving the accuracy of sampled data, especially for a low level signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
303, for rotary distributor in low speed asynchronous data system..

533 Multiplexer or distributor using pulse amplitude modulation:
This subclass is indented under subclass 498. Subject matter directed to (a) a scanning or sampling switch (multiplexer) operating above the Nyquist rate, or to (b) a demultiplexer or desampling switch (distributor) so operating, and in which the signals respectively from or to the multiplexer or distributor are transmitting in pulse amplitude modulated format (PAM).

534 Multiplexer or distributor using electron beam switching device:
This subclass is indented under subclass 498. Subject matter directed to (a) a scanning or sampling switch (multiplexer) operating above the Nyquist rate, or to (b) a demultiplexer or desampling switch (distributor) so operating, and utilizing an electron beam switching device such as a cathode-ray tube with target electrode for multiplexing or distribution.

SEE OR SEARCH THIS CLASS, SUBCLASS:
306, for nonmechanical distributor in low speed asynchronous data system.

535 Multiplexing combined with demultiplexing:
This subclass is indented under subclass 498. Subject matter including a system that combines techniques of simultaneous transmission and reception of plural signals over a common transmission medium.

536 Demultiplexing single signal into plural parallel channels (e.g., parallel transmission for increasing transmission speed):
This subclass is indented under subclass 535. Subject matter having a means that derive a group of separate channels from a complex multiplex signal.

SEE OR SEARCH CLASS:
375, Pulse or Digital Communications, subclasses 260+ for a single pulse train transmitted over plural channels.

537 Multiplexing plural input channels to a common output channel:
This subclass is indented under subclass 498. Subject matter wherein signals from plural input channels are transmitted by time multiplex to a common output channel.

538 Plural input channels of different rates to a single common rate output channel:
This subclass is indented under subclass 537. Subject matter wherein the amount of information transmitted per unit time in each input channel is different from one to another.

539 Multiple levels of multiplexing to form a multiplex hierarchy:
This subclass is indented under subclass 538. Subject matter having more than one multiplexing stage.

540 Plural input channels of same rate to a single common rate output channel:
This subclass is indented under subclass 537. Subject matter wherein all input channels have same amount of information transmitted per unit time.

541 Multiple levels of multiplexing to form a multiplex hierarchy:
This subclass is indented under subclass 540. Subject matter having more than one multiplexing stage.

542 Demultiplexing single input channel to plural output channels:
This subclass is indented under subclass 498. Subject matter having a means that derives a group of separate channels from a complex multiplex signal.

543 Different rate output channels:
This subclass is indented under subclass 542. Subject matter wherein the amount of information transmitted per unit time in each output channel is different from one to another.

544 Same rate output channels:
This subclass is indented under subclass 542. Subject matter wherein all output channels have same amount of information transmitted per unit time.

545 Conversion of rate from a single input to a single output:
This subclass is indented under subclass 498. Subject matter wherein the multiplex system has only one input and one output and the amount of information transmitted per unit time is different at the input and the output

546 MISCELLANEOUS:
This subclass is indented under the class definition. Subject matter not provided for above.

CROSS-REFERENCE ART COLLECTIONS

901 WIDE AREA NETWORK:
Art collection of the multiplex communication system consisting of multiple communication systems interconnected to form a larger communication system encompassing a larger area than that provided by any one of the interconnected communication systems.

902 Packet switching:
This subclass is indented under subclass 901. Subject matter wherein the information data to be switched by the communication systems is organized with one or more bytes preceded by an identification information indicative of a source or destination station.

903 OSI Compliant Network:
This subclass is indented under subclass 902. Subject matter wherein the communication system complies with a multilayer reference model as set forth by the Open System Interconnection standard.

(1) Note. The Open System Interconnection (OSI) Reference Model recommends a seven-layer model; Layer 1 to 7 are respectively called: Physical, Data Link, Network, Transport, Session, Presentation, and Application.

(2) Note. The structured layer approach allows partitioning complex communication rules or protocols into independent functions which could be individually modified or updated without destabilizing the entire set of rules or protocols.

904 Integrated Services Digital Network (ISDN):
This subclass is indented under subclass 903. Subject matter wherein the OSI compliant network complies with a set of communication standards for providing integrated voice and data services to users.

(1) Note. Broadband services are also provided for this set of standards.

905 Asynchronous Transfer Mode (ATM):
This subclass is indented under subclass 903. Subject matter wherein asynchronous packetized information is conveyed in regularly occurring time periods of uniform duration.

906 Fiber Data Distribution Interface (FDDI):
This subclass is indented under subclass 903. Subject matter wherein the network elements are interconnected by counter rotating, dual ring fiber optic media wherein the communication on the network is controlled used a token passing protocol.

907 Synchronous optical network (SONET):
This subclass is indented under subclass 903. Subject matter wherein the network is defined by a standard which describes a point-to-point connection over a fiber optic network which provides a digital communications hierarchy which resolves incompatibilities between North America and European digital hierarchies and is characterized by the STS-1 frame format which consists of 810 bytes.

908 LOCAL AREA NETWORK:
Art collection of the multiplex communication system wherein a plurality of user's terminals are interconnected by a common communication media.

909 Token ring:
This subclass is indented under subclass 908. Subject matter in which an idle or busy signal, indicative of the status of the communications channel or path, is passed from station to station on a closed transmission path.

910 Carrier sense multiple access (e.g., Ethernet, 10Base-T):
This subclass is indented under subclass 908. Subject matter having a reservation scheme for reaching a communication medium in which a station is assigned a carrier; the idle state of a communication channel is determined by sensing the presence or absence of a carrier signal on the channel.

911 Bridge (e.g., brouter, bus extender, etc.):
This subclass is indented under subclass 908. Subject matter having a device for interconnecting two or more local area networks.

912 PACKET COMMUNICATIONS:
Art collection of the multiplex communication system wherein the information data to be communicated by the communication systems is organized with one or more bytes preceded by an identification information indicative of a source or destination station.

913 Wireless or radio:
This subclass is indented under subclass 912. Subject matter wherein the packets are transmitted or received over free space.

914 RATE CONVERTER:
Art collection of the multiplex communication system which receives information at one bit rate and transmit at another bit rate.

915 TIME DIVISION CELLULAR RADIO SYSTEMS:
Art collection of the multiplex communication system having plural nonmobile base stations providing service to different geos:graphical areas which may overlap or may be contiguous, and wherein mobile stations are in communication with the nonmobile stations by information signals combined or distributed via separated time periods on a transmission medium.

916 MULTIPLEXER/DEMULTIPLEXER:
Art collection of the multiplex communication system including methods or apparatus for formatting, converting, combining, or distributing information signals for transmission or reception via more than one time or frequency channel.

FOREIGN ART COLLECTIONS

The definitions for FOR 100-FOR 196 below correspond to the definitions for only the following abolished subclasses under Class 370 from which these collections were formed: 53-57, 58.1-58.3, 59, 60, 60.1, 61-65, 65.5, 66-68, 68.1, 69.1, 70-84, 85.1, 85.11, 85.15, 85.2-85.9, 91-93, 94.1-94.3, 95.1-95.3, 97-99, 100.1, 101-103, 104.1, 105, 105.1-105.5, 106-109, 110.1-110.4, and 111-125. See the Foreign Art Collection schedule for specific correspondences. [**Note:** The titles and definitions for *indented* art collections include all the details of the one(s) that are hierarchically superior.]

FOR 100 SIMULTANEOUS TELEGRAPHY AND TELEPHONY:
Foreign art collection including concurrent transmission of bidirectional audio signal and a pulse information signal over a single transmission channel.

FOR 101 MULTIPLEX SWITCHING:
Foreign art collection including techniques unique to the switching of multiplexed channels, including multiplexing and subsequent switching of nonmultiplexed channels.

FOR 102 Pathfinding:
Foreign art collection including apparatus and techniques for locating a path through a switching network from a desired input to a desired output.

FOR 103 Drop channel:
Foreign art collection including one or more channels of a multiplexed composite signal removed and replaced with other channels without demultiplexing all channels down to base band.

FOR 104 Concentrators:
Foreign art collection including a switching device used to reduce the number of transmission channels required to serve remote stations by allocating a transmission channel to a remote station only when the remote station requests service (e.g., by going off hook).

FOR 105 FDM switching (frequency division multiplexing):
Foreign art collection including subject matter wherein the signals to be switched are frequency division multiplexed.

FOR 106 TDM switching (time division multiplexing):
Foreign art collection including subject matter in which access to a transmission medium is divided into discrete time intervals and information from respective channels is transmitted in differing time intervals.

FOR 107 Control processing:
Foreign art collection including specifics of circuits for controlling the time division switching.

FOR 108 Distributed:
Foreign art collection including subject matter where the control circuits are dispersed throughout the system.

FOR 109 T-S (time-space) or S-T:
Foreign art collection including subject matter in which the switching is organized to have only a time stage (which reorganized the order of time slots) and a space stage (which switches time slots on incoming lines to a desired outgoing line) in either order.

FOR 110 Packet or addressed data:
Foreign art collection including subject matter wherein the time division multiplexed data to be switched is organized with one or more bytes preceded by an address header.

FOR 111 Combined with circuit-switching:
Foreign art collection including subject matter in which packet information is combined and switched with nonpacket (e.g., synchronous) data.

FOR 112 Store and forward:
Foreign art collection including subject matter in which store and forward facilities are provided.

FOR 113 Special services with switching (e.g., conference):
Foreign art collection including the provision of special subscriber services (i.e., those not normally provided without additional fees) claimed with multiplex switching.

FOR 114 TST (time-space-time):
Foreign art collection including subject matter in which the switching is organized to have first a time state (one which reorganizes the order of the time slots) followed by a space stage (which switches time slots on incoming lines to the desired outgoing lines) followed by another time stage.

FOR 115 STS (space-time-space):
Foreign art collection including subject matter in which the switching is organized to have first a space stage (one which switches time slots on incoming lines to a desired outgoing line) followed by a time stage (which reorganizes the order of the time slots) followed by another space stage.

FOR 116 Folded network:

Foreign art collection including subject matter in which an equivalent N-stage switch is achieved with less than N-stages by "folding" back the output of one stage to connect with the input of a preceding stage.

FOR 117 Space stage, per se:
Foreign art collection including structure of a stage which switches incoming lines to outgoing lines.

FOR 118 Time only:
Foreign art collection including subject matter in which information in time slots of incoming lines is switched to desired destinations only by storing or delaying the information until the desired instant of readout.

FOR 119 Bus switch:
Foreign art collection including subject matter in which time switching occurs by connecting the lines to be connected to a common bus for a time sufficient to transfer information between the lines (e.g., one time slot).

FOR 120 Time slot interchangers, per se:
Foreign art collection including subject matter having a particular time slot interchanger/ structure.

FOR 121 With signalling feature:
Foreign art collection including subject matter having signalling equipment located at a switching exchange facility of a time division multiplex network.

FOR 122 FREQUENCY DIVISION:
Foreign art collection including subject matter in which the frequency spectrum of the transmission medium is divided into segments and respective information channels are transmitted in differing segments.

FOR 123 Multiple frequency translations:
Foreign art collection including subject matter in which multiple translations in frequency are performed on at least one information signal in a frequency division multiplex system.

FOR 124 Carrier generation:
Foreign art collection including subject matter features specific to a carrier generator.

FOR 125 Angle modulation:
Foreign art collection including subject matter in which at least one carrier in a frequency division multiplex system is angle modulated.

FOR 126 Filtering techniques:
Foreign art collection including subject matter in which devices that allow signals of certain frequencies to pass are employed for signal combination or separation in a frequency division multiplex system.

FOR 127 Digital analysis or synthesis of group:
Foreign art collection including subject matter in which an FDM composite spectrum is produced or resolved into its constituent channels by digital processing techniques.

FOR 128 Subscriber carrier:
Foreign art collection including subject matter in which additional individual subscriber service is provided by adding carrier channels to an existing communication line.

FOR 129 Connecting filters:
Foreign art collection including subject matter in which arrangements of filters or filtering techniques are employed for signal combination or separation.

FOR 130 Program distribution:
Foreign art collection including subject matter wherein program information (e.g., commercial radio broadcast) is distributed over a carrier system.

FOR 131 Bus (distributed stations):
Foreign art collection including subject matter in which information is transferred over one or more frequency division busses shared by a plurality of distributed stations.

FOR 132 Pilot:
Foreign art collection including subject matter in which at least one pilot signal is transmitted for control purposes, e.g., A.G.C., doppler correction.

FOR 133 Repeaters:
Foreign art collection including subclass matter including a repeater having features unique to frequency division multiplexing.

FOR 134 Signalling:
Foreign art collection including means for transmitting signalling information ancillary to the principal information being transmitted, e.g., E and M signalling.

FOR 135 TIME DIVISION:
Foreign art collection including subject matter in which access to the transmission medium is divided into discrete time intervals, and information from respective channels is transmitted in differing time intervals.

FOR 136 Polarity multiplex:
Foreign art collection including subject matter in which positive and negative half cycles of a carrier wave are respectively modulated independently by signals from different sources.

FOR 137 Adaptive systems:
Foreign art collection including subject matter in which the transmission format (a) changes or adapts automatically, (b) is programmed for changing traffic requirements, or (c) accommodates a plurality of sources having diverse characteristics, (e.g., rates, data format).

FOR 138 Only active channels transmitted:
Foreign art collection including subject matter in which the system adapts to changing traffic conditions by sending only data from active channels and by suppressing data from inactive channels.

FOR 139 TASI (time assigned speech interpolation):
Foreign art collection including subject matter in which time assigned speech interpolation (TASI) is used to transmit only active channels.

FOR 140 Frame length:
Foreign art collection including subject matter in which the frame length adapts to changes in traffic conditions.

FOR 141 Byte length:
Foreign art collection including subject matter in which the byte length adapts to changes in traffic conditions.

FOR 142 Rate:
Foreign art collection including subject matter (a) in which the bit rate per channel transmitted adapts to changes in traffic conditions or (b) in which different data rates are accommodated.

FOR 143 Bus transmission:
Foreign art collection including subject matter in which information is transferred to over one or more conductors which form time division communication paths between a plurality of terminals.

FOR 144 Contention:
Foreign art collection including subject matter having means to resolve situations in which plural stations attempt to gain access to the bus in the same time slot.

FOR 145 Carrier sense:
Foreign art collection including subject matter in which the idle state of the bus is determined by sensing the presence or absence of a carrier signal on the bus.

FOR 146 Token passing:
Foreign art collection including subject matter in which a signal (token) indicative of the occupancy of the communication channel is used to control access to the communication channel.

FOR 147 Loop or ring:
Foreign art collection including subject matter in which the token passing access technique is used in transmission paths having an output continuously fed back to an input.

FOR 148 Priority:
Foreign art collection including subject matter in which a particular order of transmission is assigned to stations or information.

FOR 149 Variable channel assignment:
Foreign art collection including subject matter in which allocations of information channels to transmission channels may be changed based upon changing demands.

FOR 150 Polling:
Foreign art collection including subject matter in which individual terminals are queried

to determine if access to the transmission medium is needed for the transfer of information.

FOR 151 Plural bus:
Foreign art collection including subject matter in which more than one bus is used to convey information between stations.

FOR 152 With separate control bus:
Foreign art collection including subject matter in which a separate bus is provided to transmit control information to the station (e.g., clock, address or control busses).

FOR 153 Loop or ring:
Foreign art collection including subject matter in which plural concentric loop or ring busses are used to convey information between stations.

FOR 154 Bridge between bus systems:
Foreign art collection including subject matter in which a connector (bridge) is used to interconnect separate bus communication systems.

FOR 155 Interconnection between ring or loop:
Foreign art collection including subject matter in which a connector (bridge) is used to interconnect separate transmission circuits having an output continuously fed back to an input.

FOR 156 Loop or ring:
Foreign art collection including subject matter in which the bus for communicating between stations is configured in a closed loop.

FOR 157 Asynchronous and nonsynchronous:
Foreign art collection including subject matter in which a channel allocated a transmission interval on an irregular basis.

FOR 158 Address transmitted:
Foreign art collection including subject matter in which address information accompanies the transmission of data.

FOR 159 Multiple access, discrete address:
Foreign art collection including subject matter which permits multiple access to a transmission medium by identifying each transmitter and/or receiver with a discrete address.

FOR 160 Packet:
Foreign art collection including subject matter in which time division multiplexed data is organized with one or more bytes preceded by an address header.

FOR 161 Combined with synchronous information:
Foreign art collection including subject matter in which packet information is combined with data for causing the transmission and reception of time division multiplex information to have proper time relationship.

FOR 162 Star, tree, or mesh networks:
Foreign art collection including subject matter in which the network over which the packets are to be transmitted consists of switching nodes, wherein the nodes are interconnected to form a star-shaped, tree-shaped, or mesh-shaped network.

FOR 163 Variable channel assignment:
Foreign art collection including subject matter in which the allocation of information channels to transmission channels occurs on an as-needed (i.e., nondedicated) basis.

FOR 164 Polling:
Foreign art collection including subject matter in which individual terminals are queried to determine if they need access to the transmission medium for the transfer of information.

FOR 165 Time division multiple access:
Foreign art collection including subject matter having a reservation scheme for access to a communication media in which any station is assigned a vacant time slot channel in a time division multiplex frame on the media in response to that station's request for access and the assignment lasting until it is withdrawn.

FOR 166 TDM pulse repeater:
Foreign art collection including repeaters which use time division multiplexing techniques.

FOR 167 Pilot:

Foreign art collection including a signal (pilot) separable from the usual information transmitted which signal is utilized for control, maintenance, or improvement of signal quality.

FOR 168 Byte assembly and formatting:
Foreign art collection including subject matter in which received data is assembled into a particular data format either with or without format conversion.

FOR 169 Synchronizing:
Foreign art collection including means for insuring that the transmission and reception of time division multiplex information has the proper time relationship.

FOR 170 Reference indication consists of a gap:
Foreign art collection including subject matter in which synchronization is achieved by identifying the absence of data transmission for a predetermined interval (i.e., a gap) and using that absence to identify a reference point within a transmission interval.

FOR 171 Pulse stuffing or deletion:
Foreign art collection including subject matter wherein synchronization of a pulse train is achieved by stuffing extra pulses into the train when pulses arrive too slow or deleting pulses from the train when pulses arrive too fast.

FOR 172 Mutual (reciprocal) synchronization:
Foreign art collection including subject matter wherein the clock frequency adjustment of one station is based upon information about the status of clock signals originating at other stations of the system.

FOR 173 Moving satellite:
Foreign art collection which includes means for the synchronization of stations used in a satellite communications system.

FOR 174 Distributed:
Foreign art collection including subject matter in which the synchronization word or words are spread out within a frame or over plural frames.

FOR 175 Frame:
Foreign art collection including subject matter in which synchronization is performed on a cycle of a recurring number of data bits (frame) rather than on the individual channels or bits in the frame.

FOR 176 Channel:
Foreign art collection including subject matter in which synchronization is performed on each individual channel as a whole.

FOR 177 Bit phase or jitter:
Foreign art collection including subject matter which corrects for errors in the time of occurrence of transmitted pulses.

FOR 178 Unique synchronization word:
Foreign art collection including subject matter in which the synchronization word has an unique code or bit sequence.

FOR 179 Unique synchronization pulse:
Foreign art collection including subject matter in which a synchronization bit has a width, amplitude, phase, or other property which serves to distinguish the synchronization bit from data bits.

FOR 180 Plural synchronizing words:
Foreign art collection including subject matter in which a plurality of different synchronizing words are utilized.

FOR 181 Pseudo-random:
Foreign art collection including subject matter in which a maximal length binary sequence is utilized for achieving synchronization.

FOR 182 Including delay device:
Foreign art collection including subject matter in which the timing of transmission or reception is determined by propagation of one or more pulses down a delay device.

FOR 183 Time compression or expansion:
Foreign art collection including subject matter where information is read out at a faster rate than it is stored, resulting in a time compression, or conversely where it is stored at a faster rate than it is read out, resulting in a time expansion.

FOR 184 Signalling (ancillary to main information):
Foreign art collection including subject matter with means for transmitting and/or detecting signalling information ancillary to the principal information transmitted by the system (e.g., dial pulse, on-hook/off-hook, and ringing information all ancillary to the information conveyed by a telephone call).

FOR 185 Digital tone signal generation:
Foreign art collection including a generator which creates a digital signal which represents a tone or a wave signal.

FOR 186 Digital tone detection:
Foreign art collection including a detector of digital tone or digital wave signals.

FOR 187 Superimposed or modulated on principal information:
Foreign art collection including subject matter in which the signalling information is superimposed or modulated on the principal information.

FOR 188 Inserted in gaps in main information:
Foreign art collection including subject matter in which gaps in the principal information transmitted are used for the transmission of ancillary data, e.g., signalling data transmitted during gaps in a speech signal.

FOR 189 Multiplexers/distributors (hierarchy and level):
Foreign art collection including subject matter directed to scanning or sampling switches (multiplexers) operating above the Nyquist rate, or to demultiplexers or desampling switches (distributors) so operating.

FOR 190 Apparatus and techniques for handling low level input signals:
Foreign art collection including means for improving the accuracy of sampled data, especially for low level signals.

FOR 191 Pulse amplitude modulation:
Foreign art collection including subject matter in which the signals respectively from or to the multiplexer or distributor are transmitting in pulse amplitude modulated format (PAM).

FOR 192 Electron beam switching device:
Foreign art collection including subject matter utilizing an electron beam switching device such as a cathode-ray tube with target electrode for multiplexing or distribution.

FOR 193 Staircase wave:
Foreign art collection including subject matter in which a step wave is used for control purposes such as activating a plurality of gates sequentially.

FOR 194 Magnetic core for switching or storage:
Foreign art collection including subject matter in which magnetic cores are used for switching or storage of multiplexed data.

FOR 195 TRANSMISSION BANDWIDTH CONSERVATION:
Foreign art collection including subject matter having means for providing more information per unit time on a given transmission medium.

FOR 196 MISCELLANEOUS:
Foreign art collection including subject matter not provided for above.

FOR 197 Message transmitted using regularly occurring fixed length time intervals (e.g., ATM):
Foreign art collection wherein asynchronous pack information is conveyed in regularly occurring time periods of uniform duration.

END