H04J

MULTIPLEX COMMUNICATION (transmission in general H04B; peculiar to transmission of digital information H04L5/00; systems for the simultaneous or sequential transmission of more than one television signal H04N7/08; in exchanges H04Q11/00;stereophonic systems H04S)

Definition statement

This subclass/group covers:

Multiplex Communication having circuits or apparatus for combining or dividing signals for the purpose of transmitting the signals simultaneously or sequentially over the same transmission path, and monitoring arrangements therefor.

Relationship between large subject matter areas

Class H04 Electric communication technique covers electrical communication systems with propagation paths employing beams of corpuscular radiation, acoustic waves or electromagnetic waves. Subclass H04J refers to multiplex communication in general. If the multiplex communication is specially adapted for particular applications classification is made in other subclasses of class H04.

References relevant to classification in this subclass

This subclass/group does not cover:

Optical monitoring arrangements, independent of the multiplexing method	H04B 10/08
Selecting arrangements for multiplex systems	H04Q 11/00

Examples of places where the subject matter of this class is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Use of multiplexing in transmission systems for measured values, control or similar signals	G08C 15/00
Arrangements for transmission of digital information affording multiple use of the transmission path	H04L 5/00

Systems for the simultaneous or sequential transmission of more than one television signal	H04N 7/08

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical elements, systems or apparatus	G02B
Addressing or transmission in computers	G06F 12/00, G06F 13/00
Electronic switching or gating	H03K 17/00
Transmission in general	H04B
Relay systems	H04B 7/14
Broadcast communication	H04H
Data switching networks	H04L 12/00
Modulated-carrier systems	H04L 27/00
Telephonic Communication	H04M
Selecting techniques	H04Q
Stereophonic systems	H04S
Wireless communication networks	H04W

H04J 1/00

Frequency-division multiplex systems (H04J14/02 takes precedence)

Definition statement

This subclass/group covers:

Frequency Division Multiplexing, FDM, by multiplexing two or more data sources. Covers particularly hierarchical multiplexing electrical frequencies in stages of power of 2, e.g. 8kHz, 64Khz.

References relevant to classification in this group

This subclass/group does not cover:

OFDM	H04L 5/00
FDM in satellite systems	H04B 7/15
FDM in radio system	H04B 7/26
OFDM synchronization	H04L 27/2601

Informative references

Attention is drawn to the following places, which may be of interest for search:

SCM	H04J 14/0298
FDM in CATV or HFC networks	H04N 7/00
Hybrid TDM/FDM	H04J 4/00

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

FDM	Frequency Division Multiplexing
OFDM	Orthogonal Frequency Division Multiplexing
SCM	Multiplexing of electrical subcarriers on an optical wavelength
CATV	CAble Television Systems
HFC	Hybrid Fiber Coax
TDM	Time Division Multiplex

H04J 1/04

Frequency-transposition arrangements [N: modulation with carrier or side-band suppression H03C1/52, H03C1/60; single-band suppression H04B1/00, H04B15/00; telegraphic communication H04L27/02, H04L25/49; transference of modulation from one carrier to another, e.g. frequency-changing H03D7/00; demodulation or transference of modulation of modulated electromagnetic waves H03D9/00]

Definition statement

This subclass/group covers:

Systems for transposing frequency channels carrying information onto frequency carriers Covers also FDM multiplexers, demultiplexers

Informative references

Attention is drawn to the following places, which may be of interest for search:

TDM/FDM conversion of transmultiplexing	H04J 4/005

Special rules of classification within this group

H04J 1/08 takes precedence

H04J 1/05

using digital techniques

Definition statement

This subclass/group covers:

Covers also Frequency translators, FDM multiplexers, demultiplexers, operating with digital techniques

References relevant to classification in this group

This subclass/group does not cover:

Group modulators /demodulators used for transmultiplexing FDM TDM	H04J 4/005

Informative references

Attention is drawn to the following places, which may be of interest for search:

Digital Filters	H03H 17/00

Special rules of classification within this group

H04J 1/08 takes precedence

H04J 1/06

Arrangements for supplying the carrier waves [N: Arrangements for supplying synchronisation signals (carrier supply H04L5/10; frequency multiplication H03B19/00, H03B21/00; mixing H03D7/00, H03D9/00; synchronisation in general H03B)]

References relevant to classification in this group

This subclass/group does not cover:

- Channel allocation	H04J 1/12

H04J 1/08

Arrangements for combining channels [N: (branching filters H01P1/213, H03H7/46)]

References relevant to classification in this group

This subclass/group does not cover:

Branching filters	H01P 1/213, H03H 7/46

Informative references

Attention is drawn to the following places, which may be of interest for search:

Discrete frequency-selective devices, e.g. stubs, waveguides, directional filters	H01P 1/00

H04J 1/10

Intermediate station arrangements, e.g. for branching, for tapping-off [N: repeater circuits H04B3/36, H04B3/58; two-way amplifiers H03F3/62]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Two way amplifiers	H03F 3/62
Repeater circuits	H04B 3/36

H04J 1/12

Arrangements for reducing cross-talk between channels [N: in line transmission systems H04B3/32; in cables or lines H04B3/26 to H04B3/30]

Definition statement

This subclass/group covers:
Frequency allocation, including by demand or to reduce intermodulation;

Informative references

Attention is drawn to the following places, which may be of interest for search:

In line transmission	H04B 3/32
In baseband systems	H04L 25/085

H04J 3/00

Time-division multiplex systems (H04J14/00 takes precedence; relay systems H04B7/14 ; selecting techniques H04Q)

Definition statement

This subclass/group covers:

Hierarchical frame structures, the structure repeats continuously at a fixed rate. Typically these are standard TDM frame structures at 8kHz rate like PDH, SDH or OTN. Other fixed rates frames should also be classified here and related fields.

• fixed length Ethernet (H04L 12/40)

•Digital audio transmission in fixed length formats (H04H, H04R).

Synchronization of TDM Frames

Packet transmission is classified for some specific applications:

Transmission of synchronous services like voice via packets, e.g. VoIP, is classified in H04J 3/0632, when the source clock is recovered.

Alignment of packets using packet flags should be in H04J 3/0602 for fixed line systems and in H04L 7/04 in wireless, satellite or radio systems.

Ranging of packets in an uplink in systems with a TDM frame defined in the downlink, see H04J 3/0682.

Note 1: Ranging or time alignment of a radio/wireless channel preferably in H04W 56/00. For radio/wireless systems data transmitted via a fixed network, e.g. connections between Mobile Switching Centre (MSC) and Base Station (BS) or between several Access Points (AP), documents referring to specific data of the radio/wireless channel are in H04W 56/00, e.g. alignment for handover.

Allocation of packets within a TDM frame, e.g. Ethernet in OTN payload, see H04J 3/16 or lower.

Allocation of packets in an uplink of a systems with a TDM frame defined above in the downlink, H04J 3/1694.

Note 1 : This group refers to the allocation of the bandwidth.

Note 2 : Allocation in wireless systems, see H04W or H04B 7/00;

Note 3 : Allocation of timeslots in PON, H04Q 11/0001 takes precedence

Synchronization of TDMA or packets in the meaning of time alignment, the minimum entity of detection or correction is a bit. Smaller sub-bit values refer to bit synchronization of H04L 7/00

References relevant to classification in this group

This subclass/group does not cover:

Recording	G11B
Selecting techniques	H04Q

Alignment of parallel data transmission	H04L 25/14
Frame structures of OFDM	H04L 5/00
Frame structures of wireless systems	H04B 4/26
Relay systems	H04B 7/14
Synchronization of digital video, e.g. STC or PCR timestamps	H04N 7/24

Informative references

Attention is drawn to the following places, which may be of interest for search:

Digital audio for loudspeakers	H04R
Simulcast or Single Frequency Networks	H04H 20/00
Packet networks	H04L 12/00
Internet protocol	H04L 29/00

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

SDH	Synchronous Digital Hierarchy
SONET	Synchronous Optical NETwork
OTN	Optical Transport Network
MulDex	Multiplexer/Demultiplexer

H04J 3/02

Details (electronic switching or gating H03K17/00)

This subclass/group does not cover:

Electronic switching or gating	H03K 17/00

H04J 3/04

Distributors combined with modulators or demodulators [N: (pulse distributors in general H03K5/15; pulse counters H03K21/00TO H03K29/06; for telegraphy H04L5/22, H04L13/00 to H04L23/00, H04L25/45; for telephony H04Q11/04)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Pulse counters	H03K 5/15
Pulse distributors in general	H03K 21/00
SerDes not adapted for data communication of telecommunication	H03M 9/00

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

SerDes	Serializer / Deserializer

H04J 3/045

[N: Distributors with CRT]

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

CRT	Cathode Ray tubes

H04J 3/047

[N: Distributors with transistors or integrated circuits]

Definition statement

This subclass/group covers:

Details of multiplexing or demultiplexing of bits or bytes in arrangements specially adapted for time multiplexing.

Distributors with transistors or integrated circuits

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of discrete elements, e.g. transistors	H03K 17/00
Timing and clocking in MulDex	H04J 3/0685
Higher level of abstraction of hierarchical PDH MulDex	H04J 3/1641

Special rules of classification within this group

Details of bit and byte multiplexers or demultiplexers per se, e.g. 2:1 pulse multiplexers and tree structures thereof, H03M 9/00 takes precedence.

H04J 3/06

Synchronization arrangements [N: (for television systems H04N5/04; bit-synchronisation H04L7/00)]

Definition statement

This subclass/group covers:

Synchronization of TDM networks and some specific synchronization arrangements in TDMA or packet networks.

Synchronization of TDM networks covers:

Detection of FAW and alignment of frames, H04J 3/0602;

Absorbing of phase or frequency differences by buffers, H04J 3/062;

Distribution of synchronization information and organisation of the synchronization network, H04J 3/0635.

Specific synchronization arrangement of packet or TDMA networks are:

Distribution of synchronization information and organisation of the synchronization network, H04J 3/0635

Source clock recovery over packet or ATM networks, e.g. VoIP, H04J 3/0632.

Relationship between large subject matter areas

Synchronization of wireless network when mobility of radio channel is relevant, H04W 56/00.

References relevant to classification in this group

This subclass/group does not cover:

Smaller, sub-bit, values refer to bit synchronization	H04L 7/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronization in computer networks, e.g. Time of Day	G06F 1/04
Buffers between clock domains	G06F 5/06; H04L 7/005

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

FAW	Frame Alignment Word

H04J 3/0602

[N: Systems characterised by the synchronising information used]

Definition statement

This subclass/group covers:
A FAW is used for frame aligning as synchronising information for a TDM

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frame.

References relevant to classification in this group

This subclass/group does not cover:

Specific FAW	H04J 3/0605
Details of the FAW detector	H04J 3/0608
Detection of packet headers, e.g. HDLC flag	H04L 7/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Special synchronization information, e.g. for packet or mobile transmission	H04L 7/041

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

FAW	Frame Alignment Word

H04J 3/0605

[N: Special codes used as synchronising signal]

Definition statement

This subclass/group covers:
Design rules of constructing FAW.

variable FAW, e.g. for low rate signalling, depending on the synchronization state.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Signalling in TDM	H04J 3/12

Special rules of classification within this group

FAW of standardized frames, e.g. T1, SONET, SDH or OTN are known per se are not classified here. Their detection is classified in H04J 3/0608.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

FAW	Frame Alignment Word
UW	Unique Word

H04J 3/0608

[N: Detectors therefor, e.g. correlators, state machines]

Definition statement

This subclass/group covers:
Detection of FAW by correlators, state machines, forward or backward protection.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Digital correlators	G06F 17/15
Detectors of UW for packet detection or symbol synchronisation	H04L 7/042

H04J 3/0611

[N: PN codes (H04J3/0608 takes precedence)]

Definition statement

This subclass/group covers:
PN codes used for synchronisation, if the PN synchronisation signals is varying during transmission, e.g. by a feedback Shift-register. Fixed

synchronisation signals, e.g. unique words or FAW signals, are not to be classified in this group. This also applies even if the synchronisation signal can be presented as a state of such a PN-code generator. Only if the generator shifts, then the document is classified here.

Informative references

Attention is drawn to the following places, which may be of interest for search:

PN codes used for synchronization in other transmission systems, e.g. packet or mobile	H04L 7/043

Special rules of classification within this group

H04J 3/0608 takes precedence for detection

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PN code	Pseudo-Noise or Pseudorandom code

H04J 3/062

[N: Synchronisation of signals having the same nominal but fluctuating bit rates, e.g. using buffers (pulse-stuffing H04J3/07; asynchronous-synchronous conversion H04L5/24; speed conversion H04L25/05; speed conversion in computers G06F5/06)]

Definition statement

This subclass/group covers:
Rate differences are compensated in a lossless way, e.g. by an elastic buffer or FIFO

References relevant to classification in this group

This subclass/group does not cover:

Speed conversion in computers	G06F 5/06
Pulse stuffing	H04J 3/07

Speed conversion, e.g. 8 kHz to 9,2 kHz	H04L 25/05

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

FIFO	First In First Out buffer

H04J 3/0623

[N: Synchronous multiplexing systems, e.g. synchronous digital hierarchy/synchronous optical network (SDH/SONET), synchronisation with a pointer process

Definition statement

This subclass/group covers:
Compensation of fluctuating rates in SDH/SONET or OTN

Informative references

Attention is drawn to the following places, which may be of interest for search:

PDH/SDH interfaces, e.g. desynchronizers	H04J 3/076

Synonyms and Keywords

In patent documents the following abbreviations are often used:

OTN	Optical Transport Network

H04J 3/0626

[N: plesiochronous multiplexing systems, e.g. plesiochronous digital hierarchy (PDH), jitter attenuators]

Informative references

Attention is drawn to the following places, which may be of interest for search:

PDH/SDH interfaces, e.g. desynchronizers	H04J 3/076
Slot or bandwidth allocation in PDH	H04J 3/1623

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PDH	Plesiochronous Digital Hierarchy

H04J 3/0632

[N: Synchronisation of packets and cells, e.g. transmission of voice via a packet network, circuit emulation service (CES)]

Definition statement

This subclass/group covers:

Recovery of source clock of Continuous Bit Rate (CBO) service, e.g. VoIP. The invention is located at the edge of the packet network and the output is a stream of bits.

References relevant to classification in this group

This subclass/group does not cover:

Queuing arrangement in packet networks, e.g. Flow control	H04L 12/5694
Synchronization of video or multimedia, e.g. use of MPEG PCR or STC	H04N 7/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Multimedia packet transmission and protocols	H04L 29/06027

Synonyms and Keywords

In patent documents the following abbreviations are often used:

FIFO	First In First Out buffer or elastic buffer
SRTS, RTS, SFE	Residual time stamps signalling a source clock offset compared to the network clock
CES	Circuit Emulating Switching

H04J 3/0638

[N: Clock or time synchronisation among nodes; Internode synchronisation(synchronization for ring networks H04L12/422; data switching networks with synchronous transmission H04L12/43)]

Definition statement

This subclass/group covers:
Distribution of synchronisation information among nodes, e.g. master/slave signalling or SSM.

TOD synchronization.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Clock synchronization in Computer Networks, e.g. TOD	G06F 1/14
Clock synchronization path among nodes of more than two levels	H04J 3/0679
In combination with delay compensation using timestamp to determine RTD	H04J 3/0682
Synchronisation of Ring Networks	H04L 12/422

Data switching networks with synchronous transmission	H04L 12/43

Synonyms and Keywords

In patent documents the following abbreviations are often used:

SSM	Synchronization Status Message
RTD	Round Trip Delay
NTP	Network Time Protocol
PTP	Precision Time Protocol
TOD	Time Of Day

H04J 3/0641

[N: Change of the master or reference, e.g. take-over or failure of the master]

Definition statement

This subclass/group covers:
Signalling to prevent or recover from a failure in the synchronization network.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Fail safe arrangements within the node	H04J 3/0688
Monitoring and fail safe arrangements in general	H04J 3/14
Fail safe arrangements for synchronizers in general	H04L 7/0083

Synonyms and Keywords

In patent documents the following abbreviations are often used:

APS	Automatic Protection Switching

H04J 3/0652

[N: Synchronisation among time division multiple access [TDMA] nodes, e.g. time triggered protocol [TTP](bus network with centralized control in which slots are of a TDMA packet structure H04L12/4035)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Bus network with centralized control in which slots are of a TDMA packet structure	H04L 12/403

Synonyms and Keywords

In patent documents the following abbreviations are often used:

TTP	Time Triggered Protocol

H04J 3/0667

[N: Bidirectional timestamps, e.g. NTP or PTP for compensation of clock drift and for compensation of propagation delays (monitoring or testing of delay in data switching networks H04L12/2657)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Synchronization in computer networks, e.g. Time of Day	G06F 1/04
Delay compensation for other types of time multiplexing, e.g. TDM/TDMA in	H04J 3/0682

a star configuration	
Timestamps used in protocols	H04L 12/2697
Timestamps for delay measurement for network management	H04L 12/2602

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

NTP	Network Time Protocol
PTP	Precision Time Protocol

H04J 3/0673

[N: using intermediate nodes, e.g. modification of a received timestamp before further transmission to the next packet node, e.g. including internal delay time or residence time into the packet]

Definition statement

This subclass/group covers:
Adding or modification of delay information, e.g. residence time in PTP

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interconnection of networks	H04L 12/46

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PTP	Precision Time Protocol

H04J 3/0676

[N:Mutual]

Definition statement

This subclass/group covers:
Exchange of synchronization information, e.g. buffer fill.Coupling clocks, e.g. by adding weighted signals of clock or phase errors.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Clock selection in a TDM node	H04J 3/0688

H04J 3/0679

[N: By determining clock distribution path in a network]

Definition statement

This subclass/group covers:
Determination or initialisation of clock distribution path among more than two levels of nodes according to parameters, e.g. priority, path length, number of hops, clock quality, statistics.Avoidance of clock loops or timing islands.

Synonyms and Keywords

In patent documents the following abbreviations are often used:

HMS	Hierarchical Master Slave
PAMS	Pre-Assigned Master Slave
SSM	Synchronisation Status Message

H04J 3/0682

[N: by delay compensation, e.g. by compensation of propagation delay or variations thereof, by ranging]

Definition statement

This subclass/group covers:

RTD measurement in TDM or TDMA networks for the purpose of timing adjustment, clock correction or time alignment.

References relevant to classification in this group

This subclass/group does not cover:

Bidirectional timestamps, e.g. NTP or PTP for compensation of clock drift and for compensation of propagation delays	H04J 3/067
Synchronization in mobile networks	H04W 56/0055

Informative references

Attention is drawn to the following places, which may be of interest for search:

RTD measurement and compensation in satellite systems	H04B 7/2125
RTD measurement for network management or monitoring	H04L 12/2657
PON in general	H04Q 11/0001

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

PON	Passive Optical Network
CATV	CAble TeleVision
RTD	Round Trip Delay

H04J 3/0688

[N:Change of master or reference, e.g. take-over/failure of the master]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Fail safe arrangements of PLL	H03L 7/00
Monitoring and fail safe arrangements in general	H04J 3/14
Fail safe arrangements for synchronizers in general	H04L 7/0083

Synonyms and Keywords

In patent documents the following abbreviations are often used:

APS	Automatic Protection Switching

H04J 3/0694

[N:Synchronisation in a TDMA node, e.g. TTP]

Synonyms and Keywords

In patent documents the following abbreviations are often used:

TTP	Time Triggered Protocol

H04J 3/0697

[N:Synchronisation in a packet node]

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PTP	Precision Time Protocol

H04J 3/07

using pulse stuffing for systems with different or fluctuating information rates [N: or bit rates]

Definition statement

This subclass/group covers:

Variable length stuffing; self marking stuff indications

This subgroup does not refer to stuffing of packet flags as line coding to interrupt a long sequence of identical bit values.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Line coding	H04L 25/49
Packet headers or flags	H04L 29/06
Fill bit or bits in non-TDM formats,	H04L 2007/045

Synonyms and Keywords

In patent documents the following abbreviations are often used:

WTJ	Waiting Time Jitter
STM	Stuff Threshold Modulation

In patent documents the following words "justification" and "stuffing" are often used as synonyms

H04J 3/073

[N:Bit stuffing, e.g. PDH]

Informative references

Attention is drawn to the following places, which may be of interest for search:

PDH buffering	H04J 3/0626
PDH framing formats and slot allocation	H04J 3/1623

H04J 3/076

[N: Bit and byte stuffing, e.g. SDH/PDH desynchronisers, bit-leaking]

Definition statement

This subclass/group covers:
Stuffing in OTN

Informative references

Attention is drawn to the following places, which may be of interest for search:

Buffer arrangements for synchronization in SDH/SONET or OTN	H04J 3/0623

Synonyms and Keywords

In patent documents the following abbreviations are often used:

OTN	Optical Transport Network

H04J 3/08

Intermediate station arrangements, e.g. for branching, for tapping-off

Definition statement

This subclass/group covers:
ADM Add Drop Multiplexers

Synonyms and Keywords

In patent documents the following abbreviations are often used:

ADM	Add Drop Multiplexer

H04J 3/085

[N: For ring networks, e.g. SDH/SONET rings, self-healing rings, meshed SDH/SONET networks]

Definition statement

This subclass/group covers:
Protection in TDM ring networks

References relevant to classification in this group

This subclass/group does not cover:

Protection in TDM networks in general	H04J 3/14
Protection in optical ring networks	H04J 14/0287
Protection in packet ring networks, e.g. RPR	H04L 12/437

Synonyms and Keywords

In patent documents the following abbreviations are often used:

CW	Clockwise
CCW	Counter Clockwise
UPSR	Unidirectional Protection Switched Ring
BLSR	Bidirectional Line Switched Ring

H04J 3/125

[N: One of the channel pulses or the synchronisation pulse is also used for transmitting calling or supervisory signals]

Definition statement

This subclass/group covers:

Bit stealing for signalling, e.g. winking in PDH T1.

Informative references

Attention is drawn to the following places, which may be of interest for search:

LSB bit dropping for making bandwidth available for user payload	H04J 3/1688

H04J 3/14

Monitoring arrangements [N: (for SDH/SONET rings H04J3/085)]

Definition statement

This subclass/group covers:
Protection Switching; Testing of TDM systems.

References relevant to classification in this group

This subclass/group does not cover:

Monitoring or Protection Switching of TDM rings	H04J 3/085
Protection switching of SDH/SONET or OTN	H04J 2203/006

Informative references

Attention is drawn to the following places, which may be of interest for search:

Network management	H04L 12/24

H04J 3/16

in which the time allocation to individual channels within a transmission cycle is variable, e.g. to accommodate varying complexity of signals, to vary number of channels transmitted (H04J3/17, H04J3/24 take precedence)

Definition statement

This subclass/group covers:
Covering variable time slot allocation.

H04J 3/1605 fixed standard frame structures.

H04J 3/1611 SDH

H04J 3/1623 PDH

H04J 3/1652 OTN;

H04J 3/1682 statistical multiplexers, allocation changes per frame cycle

H04J 3/1694 distributed multiplexers, e.g. access multiplexer

Relationship between large subject matter areas

For specific applications, e.g. video H04N 7/00; or physical medium, e.g. radio H04B 7/00, see more specialized classes

H04J 3/1611

[N: Synchronous digital hierarchy (SDH) or SONET (H04J3/1664 takes precedence for interactions with OTN)]

Definition statement

This subclass/group covers:
Refers to systems according to ITU recommendations G.707 - G.709 in the versions of 1990 (SDH/SONET)

Radio, satellite and microwave transmission according to the standards mentioned above.

Covers switches, nodes and Cross-connects and respective internal or proprietary formats

References relevant to classification in this group

This subclass/group does not cover:

Interactions with OTN	H04J 3/1664

Informative references

Attention is drawn to the following places, which may be of interest for search:

SDH/SONET or OTN ring networks	H04J 3/085	

Synonyms and Keywords

In patent documents the following abbreviations are often used:

SPE	Synchronous Payload Envelope

H04J 3/1617

[N:carrying packets or ATM cells]

Definition statement

This subclass/group covers:
SPE carries ATM cells or payload data packets

Relationship between large subject matter areas

H04J 2203/0082 Services, Interaction of SDH with non-ATM protocols

H04J 2203/0083 Support of the IP protocol

H04J 2203/0085 Support of Ethernet

Informative references

Attention is drawn to the following places, which may be of interest for search:

Stuffing, destuffing and desynchronization	H04J 3/076
SDH/SONET or OTN ring networks	H04J 3/085
Packet networks in general	H04L 12/00
Data networks and protocols	H04L 29/00

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PoS	Packet over SONET
GFP	Generic Framing Procedure
SPE	Synchronous Payload Envelope

H04J 3/1623

[N:Plesiochronous digital hierarchy (PDH)]

Definition statement

This subclass/group covers:

Covers switches, nodes and Cross-connects and respective internal or proprietary formats.

Also covers transport of packets via a plesiochronous network, e.g. "ATM over E1".

H04J 3/1629

[N:Format building algorithm]

Definition statement

This subclass/group covers:

Time slot allocation according to rules, e.g. to evenly distributed slots to various users while minimizing the distance to ideal evenly distributed slot allocation for a single user.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Splitting time slots to smaller entities or concatenating time slots to larger entities	H04J 3/1647
Time slot allocation according the instantaneous needs of the sources to be multiplexed	H04J 3/1682

H04J 3/1635

[N:Format conversion, e.g. CEPT/US]

Definition statement

This subclass/group covers:

Format conversion of PDH frames of different standards, e.g. ETSI and ANSI

H04J 3/1641

[N:Hierarchical systems]

Definition statement;

This subclass/group covers:

DS0, DS1, DS3 or European PDH, PCM30/32, E1 to E4 according to ITU recommendation G.703. Covers the hardware structure of programmable TDM multiplexer, e.g. internal construction by bus, as described in ITU recommendation G.797.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electronic details of multiplexers or demultiplexers, e.g. multiplexing of bits or bytes	H04J 3/047

Synonyms and Keywords

In patent documents the following abbreviations are often used:

MULDEX	Multiplexer Demultiplexer

H04J 3/1647

[N:Subrate or multislot multiplexing]

Definition statement

This subclass/group covers:

Variable allocation of elementary units like time slots, subslots or fragments. The allocation can be modified by splitting elementary units or by combining elementary units to units of larger bandwidth. The overall frame length remains constant.

H04J 3/1652

[N:Optical Transport Network (OTN)]

Definition statement

This subclass/group covers:
Refers to systems according to ITU recommendation G.707 - G.709 in the versions of 2000.

Covers radio and microwave transmission according to the standards mentioned above.

Covers switches, nodes and Cross-connects and respective internal or proprietary formats.

Informative references

Attention is drawn to the following places, which may be of interest for search:

SDH/SONET or OTN ring networks	H04J 3/085
SDH/SONET as preceding technology to OTN	H04J 3/1611
Optical wavelength networks	H04J 14/02

Synonyms and Keywords

In patent documents the following abbreviations are often used:

SPE	Synchronous Payload Envelope

H04J 3/1658

[N:carrying packets or ATM cells; H04J3/1664 takes precedence for payloads with different packet types]

Special rules of classification within this group

H04J 3/1664 takes precedence for payloads with different packet types

H04J 3/167

[N : interaction with SDH/SONET, e.g. carrying SDH/SONET frames, interfacing with SDH/SONET; H04J3/1664 takes precedence]

H04J 3/1676

[N:Time-division multiplex with pulse-position, pulse-interval, or pulse-width modulation]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Fee space optical transmission with PPM or PWM	H04B 10/00N
General PPM or PWM transmission	H04B 14/026
PPM or PWM modulation	H04L 25/4902

H04J 3/1682

[N:Allocation of channels according to the instantaneous demands of the users, e.g. concentrated multiplexers, statistical multiplexers]

Definition statement

This subclass/group covers:
This group covers

Allocation of bandwidth changes instantaneously, e.g. on demand or according to buffer fill.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Distributed multiplexers, e.g. access multiplexers	H04J 3/1694
Packet multiplexing in general	H04J 3/247

Hybrid switching, e.g. moveable boundary between CS and PS	H04L 12/64
Voice over Date multiplexing for a single user	H04M 11/06
Statistical multiplexing for video or multimedia	H04N 7/24

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

CS	Circuit Switched service
PS	Packet Switched service

H04J 3/1688

[N: the demands of the users being taken into account after redundancy removal, e.g. by predictive coding, by variable sampling (reducing bandwidth of signals in general H04B1/66; in PCM-systems H04B14/046; removal of redundancy in telegraph communication H03M7/30)]

References relevant to classification in this group

This subclass/group does not cover:

Reducing bandwidth of signals in general	H04B 1/66
Reducing bandwidth of signals in PCM-systems	H04B 14/046

Informative references

Attention is drawn to the following places, which may be of interest for search:

LSB dropping of bit stealing for transporting signalling	H04J 3/125

Digital Speech Interpolation (DSI)	H04J 3/177
Digital Circuit Multiplication (DCM)	H04J 3/177

H04J 3/1694

[N: Allocation of channels in TDM/TDMA networks, e.g. distributed multiplexers (Passive Optical Networks H04Q11/0062)]

References relevant to classification in this group

This subclass/group does not cover:

Time slot allocation in Passive Optical Networks	H04Q 11/0062
Time slot allocation in wireless networks	H04W 72/04 H04B 7/2643

Informative references

Attention is drawn to the following places, which may be of interest for search:

Time slot allocation in computer networks via CATV or HFC	H04L 12/2801

Synonyms and Keywords

In patent documents the following abbreviations are often used:

CATV	CAble TeleVision
HFC	Hybrid Fibre Coax

H04J 3/17

in which the transmission channel allotted to a first user may be taken away and re-allotted to a second user if the first user

becomes inactive, e.g. TASI [N: (speech analysis or identification 42T2B, G10L)]

References relevant to classification in this group

This subclass/group does not cover:

DTX in wireless networks for power saving	H04W 76/048, H04W 52/12

Informative references

Attention is drawn to the following places, which may be of interest for search:

Speech analysis	G10L
Distributed multiplexers, e.g. access multiplexers	H04J 3/1694
Silence suppression in packet networks	H04L 2012/6494

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

DTX	Discontinuous Transmission
Comfort Noise	Introduction of noise signal to have a more comfortable audio signal during speech pauses

Synonyms and Keywords

In patent documents the following abbreviations are often used:

TASI	Time Assignment Speech Interpolation
DSI	Digital Speech Interpolation

H04J 3/172

[N:Digital speech interpolation, i.e. DSI]

References relevant to classification in this group

This subclass/group does not cover:

PRMA (Packet Reservation Multiple Access),	H04L 12/00, H04W

H04J 3/175

[N:Speech activity or inactivity detectors (echo suppressors H04B3/20)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

VAD	G10L 11/02
Instant speaker`s algorithm in telephony systems	H04M 3/569

Synonyms and Keywords

In patent documents the following abbreviations are often used:

VAD	Voice Activity Detection

H04J 3/18

using frequency compression and subsequent expansion of the individual signals

Informative references

Attention is drawn to the following places, which may be of interest for search:

Frame conversion	H04J 3/1635

H04J 3/22

in which the sources have different rates or codes [N: (simultaneous speech and digital data or video transmission H04M11/06; see provisional also H04J3/16)]

Definition statement

This subclass/group covers:
Different symbol rates in the slots of the TDM frame.

Relationship between large subject matter areas

Different or variable user rates or source rates are classified under H04J 3/1605 or sub-groups.

H04J 3/24

in which the allocation is indicated by an address [N: the different channels being transmitted sequentially] (H04J3/17 takes precedence; in computers G06F12/00, G06F13/00 [N: code multiplex systems H04J13/00; selecting techniques H04Q; relay systems H04B7/14])

Special rules of classification within this group

CDMA and Spread-spectrum communication, H04J 13/00 takes precedence.

H04J 3/242

[N:The frames being of variable length]

References relevant to classification in this group

This subclass/group does not cover:

Variable length frames or packets to avoid errors	H04L 1/0078

H04J 3/247

[N:ATM or packet multiplexing]

Definition statement

This subclass/group covers:

Generic packet or ATM multiplexing

Informative references

Attention is drawn to the following places, which may be of interest for search:

Packet multiplexing in general	H04L 12/00

H04J 3/26

in which the information and the address are simultaneously transmitted

Definition statement

This subclass/group covers:

Time frequency encoded transmission. The combination of time and frequency is determined by the receiver address and the transmitted information.

Transmission of address by Pulse Position Modulation (PPM).

Random sampling of analog sources

Synonyms and Keywords

In patent documents the following abbreviations are often used:

RADA	Random Access Discrete Address

H04J 4/00

Combined time-division and frequency-division multiplex systems (H04J13/00 takes precedence; [N: data transmission H04L5/26; telemetry G08C15/00])

References relevant to classification in this group

This subclass/group does not cover:

Time and Frequency allocation of OFDM systems	H04L 5/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Allocation of time/frequency in radio systems	H04B 7/2615

Synonyms and Keywords

In patent documents the following abbreviations are often used:

OFDM	Orthogonal Frequency Division Multiplexing

H04J 4/005

[N:Transmultiplexing]

Definition statement

This subclass/group covers:
Translation of TDM into FDM and vice versa.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Satellite systems	H04B 7/15
Group demodulation	H04J 1/05

H04J 7/00

Multiplex systems in which the amplitudes or durations of the signals in individual channels are characteristic of those channels

Definition statement

This subclass/group covers:
Simultaneous transmission of analog and digital, e.g. by overmodulation

Informative references

Attention is drawn to the following places, which may be of interest for search:

FAW having a special amplitude	H04J 3/0614
Multiple use of the transmission path the signals being represented by different amplitude or polarities, e.g. quadriplex	H04L 5/04
Synchronization signal having a special amplitude	H04L 7/06

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

FAW	Frame Alignment Word of a TDM frame

H04J 9/00

Multiplex systems in which each channel is represented by a different type of modulation of the carrier

References relevant to classification in this group

This subclass/group does not cover:

Modification of modulation constellation	H04L 27/3483

H04J 11/00

Orthogonal multiplex systems, [N: e.g. using WALSH codes] (H04J13/00 takes precedence)

Definition statement

This subclass/group covers:

Orthogonal multiplex systems at the physical layer, techniques relating to problems arising from the multiplexing of users / base stations. Aspects that

are covered include

cell search, i.e. how a mobile phone finds the identity of base stations;

interference handling and cancellation, at the transmitter, the receiver or both, especially

subtractive interference cancellation

intercell interference cancellation at the physical layer.

Examples of orthogonal multiplexing techniques are OFDMA [Orthogonal Frequency Division Multiple Access], SC-FDMA [Single Carrier Frequency Division Multiple Access].

Examples of systems using orthogonal multiplexing are LTE [Long Term Evolution], LTE-advanced.

Relationship between large subject matter areas

Code multiplexing techniques, orthogonal or not, are classified in H04J 13/00 if the focus is on the code multiplexing aspects and in H04B 1/69 if the focus is on the implementation of the spread-spectrum technique (e.g. details of how the signals are physically transmitted, received and processed).

References relevant to classification in this group

This subclass/group does not cover:

Narrowband interference reduction	H04B 1/1036
Direct sequence spread spectrum	H04B 1/707F
Frequency Hopping	H04B 1/713
Spatial processing techniques	H04B 7/02
Allocation of channels of OFDM systems	H04L 5/00
Details of Linear Filters and Decision Feedback Equalisers	H04L 25/03006
Sequence estimation techniques, including multi user sequence estimation	H04L 25/03178
Correlative coding in synchronous or start-stop systems	H04L 25/497

OFDM modulation techniques	H04L 27/2601
OFDM frequency synchronisation techniques	H04L 27/2655
Power management	H04W 52/00
Local resource allocation of wireless systems	H04W 72/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cell search in CDMA systems	H04B 1/7083
Interference aspects in CDMA systems	H04B 1/7097
Broadcast communication	H04H
Modulated-carrier systems	H04L 27/00
Telephonic Communication	H04M
Processing access restriction or access information	H04W 48/16
Discovery of network devices for network data management	H04W 8/005

Special rules of classification within this group

Additional information is classified with the corresponding CPC codes. Classification of additional information is compulsory.

H04J 13/00

Code division multiplex systems (for frequency hopping H04B1/713)

Definition statement

This subclass/group covers:

Code division multiplexing techniques which are related to the division of the communication medium according to codes.

Aspects that are covered include types of codes, generation of codes and allocation of codes to channels.

Relationship between large subject matter areas

With regard to spread-spectrum techniques, the borderline between H04J 13/00 and H04B 1/69 should be determined based on whether the features relevant for classification are focused on the code multiplexing aspects or the implementation of the spread-spectrum technique (e.g. details of how the signals are physically transmitted, received and processed).

Documents classified in H04J 13/00 containing aspects of spectral spreading of interest for search, may also be classified in group H04B 1/69.

With regard to systems that use frequency hopping as a means to divide the communication medium, it has been agreed that that frequency hopping is excluded from H04J 13/00 even if it is used within the context of multiple access. Because the concepts dealt with in H04J 13/00 do not have relevance for FH-CDMA even though frequency hopping can be used for CDMA (i.e. FH-CDMA), this subject-matter is exclusively classified in H04B 1/713.

References relevant to classification in this group

This subclass/group does not cover:

Details of the signal processing which are covered by systems that use frequency hopping as a means to divide the communication medium	H04B 1/713
MC-CDMA	H04J 11/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Implementation of the spread-spectrum technique	H04B 1/69

Special rules of classification within this group

Additional information is classified with the corresponding CPC codes.

Classification of additional information is compulsory.

When classifying in this group, any aspect of spread spectrum techniques not specific to frequency hopping, and which is considered to represent information of interest for search, may also be classified in group H04B 1/69.

Synonyms and Keywords

In patent documents the following abbreviations are often used:

CDMA	Code Division Multiple Access
MC-CDMA	Multi-carrier Code Division Multiple Access
OVSF	Orthogonal variable spreading factor

H04J 14/00

Optical multiplex systems (optical coupling, mixing or splitting, per se G02B)

References relevant to classification in this group

This subclass/group does not cover:

Optical devices per se	G02B, G02F
Laser, amplifier per se	H01S 3/00, H01S 5/00
Electrical multiplex systems	H04J 1/00, H04J 3/00, H04J 4/00, H04J 7/00, H04J 9/00, H04J 11/00, H04J 13/00
Optical switching per se	H04Q 11/0001

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical coupling devices, e.g. optical fibres, optical gratings	G02B 6/00
Optical integrated multiplexers and demultiplexers devices, e.g. AWG,	G02B 6/12007

optical interferometers	
Optical coupling with wavelength selective means	G02B 6/293
Devices or arrangements for the control of the intensity, colour, phase, polarisation or direction of light arriving from an independent light source, e.g. switching, gating, or modulating; Non-linear optics	G02F 1/00
Demodulating light; Transferring the modulation of modulated light; Frequency-changing of light	G02F 2/00
Optical Transmission	H04B 10/00
Electrical Time-division multiplex systems	H04J 3/00

H04J 14/002

[N: Coherence multiplexing]

Definition statement

This subclass/group covers:
Coherence Multiplex for data transmission

References relevant to classification in this group

This subclass/group does not cover:

Sensor systems	G08C 15/00.
Coherent homodyne or heterodyne systems	H04B 10/00.

H04J 14/005

[N: Optical Code Multiplex]

Definition statement

This subclass/group covers:
Optical code division multiplexing systems

References relevant to classification in this group

This subclass/group does not cover:

Electrical code division multiplexing	H04J 13/00

H04J 14/007

[N:Orthogonal Optical Code Multiplex]

Definition statement

This subclass/group covers:
Orthogonal optical code division multiplexing systems

References relevant to classification in this group

This subclass/group does not cover:

Electrical orthogonal multiplexing systems	H04J 11/00

H04J 14/02

Wavelength-division multiplex systems

Definition statement

This subclass/group covers:
Wavelength division multiplex systems, in general, as well as WDM equipment terminal, e.g. WDM sources and WDM receivers.

H04J 14/0201

[N: Add-and-drop multiplexing]

Definition statement

This subclass/group covers:
Optical add and drop multiplexing systems for WDM systems

In patent documents the following abbreviations are often used:

OADM	Optical Add and Drop multiplexing

H04J 14/0202

[N: Arrangements therefor]

Definition statement

This subclass/group covers:
Internal arrangements details of OADM for WDM systems

H04J 14/0204

[N: Broadcast and select arrangements, e.g. with an optical splitter at the input before adding or dropping]

Definition statement

This subclass/group covers:
OADM arrangements that first broadcast the input signals, typically implemented with an optical splitter at the input of the OADM, and then select among the signals before they are output.

H04J 14/0205

[N: Select and combine arrangements, e.g. with an optical combiner at the output after adding or dropping]

Definition statement

This subclass/group covers:
OADM arrangements that first selects among the input signals at the input of the OADM and then combines the signals before they are output, typically implemented with an optical combiner at the output of the OADM

H04J 14/0206

[N: Express channels arrangements]

Definition statement

This subclass/group covers:

OADM arrangements that allow express channels to be directly brought from the input of the OADM to the input of the OADM, typically for minimising the insertion losses incurred by those channels.

H04J 14/0208

[N: Interleaved arrangements]

Definition statement

This subclass/group covers:

OADM arrangements that include multiplexing and/or demultiplexing using interleavers, e.g. processing the odd and even WDM channels separately.

H04J 14/0209

[N: Multi-stage arrangements, e.g. by cascading multiplexers or demultiplexers]

Definition statement

This subclass/group covers:

OADM arrangements where multiplexing and/or demultiplexing are implemented by a cascading of multiple stages.

H04J 14/021

[N: Reconfigurable arrangements, e.g. reconfigurable optical add/drop multiplexers [ROADM] or tunable optical add/drop multiplexers [TOADM]]

Definition statement

This subclass/group covers:

Reconfigurable or tuneable OADM arrangements where the optical channels that are actually added or dropped can be changed during the operation of the OADM.

H04J 14/0212

[N: using optical switches or wavelength selective switches [WSS]]

Definition statement

This subclass/group covers:

OADM arrangements where the reconfiguration is accomplish by using optical switches or wavelength selective switches.

H04J 14/0213

[N: Groups of channels or wave bands arrangements]

Definition statement

This subclass/group covers:
OADM arrangements where the groups of channel or wave bands are processed together.

H04J 14/0215

[N: Architecture aspects]

Definition statement

This subclass/group covers:
Architectures aspects of OADM in WDM systems in terms of how they relate to the WDM networks where they are in.

H04J 14/0216

[N: Bidirectional architectures]

Definition statement

This subclass/group covers:
OADM architectures that are prepared to be used in bidirectional networks, meaning that the ports of the OADM are input and output ports at the same time and consequently the fibres connected at those ports transmit optical WDM signals in both directions.

H04J 14/0217

[N: Multi-degree architectures, e.g. having a connection degree greater than two]

Definition statement

This subclass/group covers:
OADM architectures that have more than one input and/or more than one output (the degree of a node in a network is defined as the number of input plus output ports of such node).

H04J 14/0219

[N: Modular or upgradable architectures]

Definition statement

This subclass/group covers:

OADM architectures constituted by modules that are repeated to increase the capabilities of the node, typically to upgrade the number of channels that can be added or dropped.

H04J 14/022

[N: For interconnection of WDM optical networks]

Definition statement

This subclass/group covers:

OADM architectures that are used for interconnecting different WDM networks, e.g. interconnected rings.

H04J 14/0221

[N: Power control, e.g. to keep the total optical power constant]

Definition statement

This subclass/group covers:

Power control in a WDM system. Subject covers equalizing power of the different wavelengths, e.g. to keep the total optical power constant or to control the optical power per channel in a WDM system so as to maintain constant a particular performance related characteristic. Also covers control of power transients due to add and drop wavelengths, wavelength switching, e.g. caused by protection switching, or wavelength re-allocation.

H04J 14/0223

[N:Conversion to or from optical TDM]

Definition statement

This subclass/group covers:

Conversion from WDM signals into OTDM or vice versa to facilitate the multiplexing or demultiplexing of optical channels.

H04J 14/0224

[N: Irregular wavelength spacing, e.g. to accommodate interference to all wavelengths]

Definition statement

This subclass/group covers:

WDM irregular allocation plans, typically to overcome non-linear effects or to accommodate optical channels of different bit rate. This group covers also regular schemes in which carriers remain unused, e.g. to avoid interference.

H04J 14/0226

[N: Fixed carrier allocation, e.g. according to service]

Definition statement

This subclass/group covers:

Fixed carrier allocation according to service or for a particular use, e.g. dummy channels to keep the power constant.

H04J 14/0227

[N: Operation, administration, maintenance or provisioning [OAMP] of WDM network, e.g. media access, routing or wavelength allocation (monitoring of optical transmission parameters in general H04B10/07)]

Definition statement

This subclass/group covers:

Wavelength allocation and assignment for WDM and the application of management to WDM networks. It covers routing, e.g. use of tables for wavelength routing, and wavelength allocation algorithms, dynamic allocation of wavelengths and use of a dedicated wavelength for OAM, e.g. optical service channel, and pilot tones for OAM. It also covers optical channel and optical multiplex identification and labelling, optical signalling in WDM networks and WDM networks restoration (in network restoration, as opposed to network protection, all available resources in the network are considered when looking for a new path to be established).

H04J 14/0278

[N: WDM optical network architectures]

Definition statement

This subclass/group covers:

WDM optical networks defined by the type of interconnection between WDM

nodes

H04J 14/0279

[N: WDM point-to-point architectures]

Definition statement

This subclass/group covers:
WDM systems using a point to point network connection between two WDM nodes.

H04J 14/028

[N: WDM bus architectures]

Definition statement

This subclass/group covers:
Multiple WDM nodes connected to two adjacent WDM nodes, except for the two nodes constituting the bus head-end, and using a common optical fibre supporting a WDM signal.

H04J 14/0282

[N: WDM tree architectures]

Definition statement

This subclass/group covers:
A common WDM node is connected via multiple fibres to a multiplicity of other WDM nodes. It also covers the case of star networks, where multiple WDM nodes are interconnected to other WDM nodes using multiple optical fibres each supporting a WDM signal, typically using a star coupler.

H04J 14/0283

[N: WDM ring architectures]

Definition statement

This subclass/group covers:
WDM architecture where all WDM nodes are connected to two adjacent nodes using a common optical fibre supporting a WDM signal.

H04J 14/0284

[N:WDM mesh architectures]

Definition statement

This subclass/group covers:
WDM architecture where each WDM node is typically connected to every other node using multiple optical fibres, each supporting a WDM signal.

H04J 14/0286

[N: WDM hierarchical architectures]

Definition statement

This subclass/group covers:
WDM networks where different layers of interconnection between the different WDM nodes. Each layer can be of the same type of network architecture or of different types.

H04J 14/0287

[N: Protection in WDM systems]

Definition statement

This subclass/group covers:
Protection aspects in WDM systems, typically switching from a protected resource to a protection resource when a failure occurs. As opposed to network restoration, network protection considers only resources that have a priori been labelled as protection resources.

H04J 14/0289

[N: Optical multiplex section protection]

Definition statement

This subclass/group covers:
Protection is carried out at the level of the whole WDM multiplex.

H04J 14/029

[N: Dedicated protection at the optical multiplex section (1+1)]

Definition statement

This subclass/group covers:
A WDM multiplex is duplicated and transmitted simultaneously using two

WDM multiplex signals. The selection of which WDM signal to receive is done at the WDM level and at the receiver end, typically without considering any specific signalling from the transmitter end.

H04J 14/0291

[N: Shared protection at the optical multiplex section (1:1, n:m)]

Definition statement

This subclass/group covers:

A WDM multiplex is transmitted using working resources and in case that a failure occurs, then the WDM multiplex is switched to the protection resource, typically shared by different nodes. At the receiver end the WDM signal coming via the protection resource is selected, typically this mechanism involves switching or bridging at both transmitter and receiver ends at the WDM multiplex level any requires some signalling between transmitter and receiver ends. The protection WDM multiplex can be used by low priority traffic until protection takes place.

H04J 14/0294

[N: Dedicated protection at the optical channel (1+1)]

Definition statement

This subclass/group covers:

A WDM channel is duplicated and transmitted simultaneously using two WDM channels. The selection of which WDM channel to receive is done at the channel level and at the receiver end, typically without considering any specific messaging from the transmitter end.

H04J 14/0295

[N: Shared protection at the optical channel (1:1, n:m)]

Definition statement

This subclass/group covers:

WDM channels are transmitted using working resources and in case that a failure occurs, then the WDM channel is switched to the protection resource, typically shared by different WDM channels. At the receiver end the WDM signal coming via the protection resource is selected, typically this mechanism involves switching or bridging at both transmitter and receiver ends at the channel level any requires some signalling between transmitter and receiver ends. The protection channels can be used by low priority traffic until protection takes place.

H04J 14/0297

[N: Optical equipment protection]

Definition statement

This subclass/group covers:
WDM is duplicated to protect the equipment against internal faults.

H04J 14/0298

[N: with sub-carrier multiplexing (SCM)]

Definition statement

This subclass/group covers:
Sub-carrier multiplexing system, e.g. for CATV.

H04J 14/04

Mode multiplex systems

Definition statement

This subclass/group covers:
Systems where the different modes of transmission in the optical fibres are used to multiplex different channels of information.

H04J 14/06

Polarisation multiplex systems

Definition statement

This subclass/group covers:
System where the different states of polarisation of the light are used to multiplex different channels of information.

H04J 14/08

Time-division multiplex systems

Definition statement

This subclass/group covers:
Systems using optical time division multiplexing (OTDM). Time multiplexing of optical pulses.

References relevant to classification in this group

This subclass/group does not cover:

Optical synchronisation	H04L 7/0075

H04J 14/083

[N:Add and drop multiplexing]

Definition statement

This subclass/group covers:
Optical add and drop multiplexing systems for OTDM systems.

H04J 14/086

[N: Medium access (H04J3/16 takes precedence)]

Definition statement

This subclass/group covers:
Medium access in OTDM systems.

Special rules of classification within this group

H04J 3/16 takes precedence

H04J 15/00

[N: IPC2008.01] Multiplex systems not otherwise provided for