

**CPC****COOPERATIVE PATENT CLASSIFICATION****H04J**

**MULTIPLEX COMMUNICATION** (transmission in general [H04B](#); peculiar to transmission of digital information [H04L 5/00](#) ; systems for the simultaneous or sequential transmission of more than one television signal [H04N 7/08](#) ; in exchanges [H04Q 11/00](#) ; stereophonic systems [H04S](#))

**NOTE**

This subclass covers

- circuits or apparatus for combining or dividing signals for the purpose of transmitting them simultaneously or sequentially over the same transmission path;
- monitoring arrangements therefor.

**H04J 1/00**

**Frequency-division multiplex systems** ([H04J 14/00](#) takes precedence)

**H04J 1/02**

. Details

**H04J 1/04**

.. Frequency-transposition arrangements {(modulation with carrier or side-band suppression [H03C 1/52](#) , [H03C 1/60](#) ; single-band suppression [H04B 1/00](#) , [H04B 15/00](#) ; telegraphic communication [H04L 27/02](#) , [H04L 25/49](#) ; transference of modulation from one carrier to another, e.g. frequency- changing [H03D 7/00](#) ; demodulation or transference of modulation of modulated electromagnetic waves [H03D 9/00](#))}

**H04J 1/045**

... {Filters applied to frequency transposition}

**H04J 1/05**

... using digital techniques

**H04J 1/06**

.. Arrangements for supplying the carrier waves {Arrangements for supplying synchronisation signals (carrier supply [H04L 5/10](#) ; frequency multiplication [H03B 19/00](#) , [H03B 21/00](#) ; mixing [H03D 7/00](#) , [H03D 9/00](#) ; synchronisation in general [H03B](#))}

**H04J 1/065**

... {Synchronisation of carrier sources at the receiving station with the carrier source at the transmitting station}

**H04J 1/08**

.. Arrangements for combining channels {(branching filters [H01P 1/213](#) , [H03H 7/46](#))}

**H04J 1/085**

... {Terminal station; Combined modulator and demodulator circuits}

**H04J 1/10**

.. Intermediate station arrangements, e.g. for branching, for tapping-off {(repeater circuits [H04B 3/36](#) , [H04B 3/58](#) ; two-way amplifiers [H03F 3/62](#))}

**H04J 1/12**

.. Arrangements for reducing cross-talk between channels {(in line transmission systems [H04B 3/32](#) ; in cables or lines [H04B 3/26](#) to [H04B 3/30](#))}

**H04J 1/14**

.. Arrangements providing for calling or supervisory signals

**H04J 1/16**

.. Monitoring arrangements {(for transmission in general [H04B 17/00](#) ; for amplifiers [H03F 1/52](#) , [H03F 1/523](#))}

**H04J 1/18**

. in which all the carriers are amplitude-modulated ([H04J 1/02](#) takes precedence{ in telephony [H04Q 11/02](#) , [H04Q 11/023](#) ; in stereophony [H04H](#) ; in telegraphy [H04L 5/06](#) ; in telemetry [G08C 15/02](#) , [G08C 15/04](#))}

- H04J 1/20 . in which at least one carrier is angle-modulated ([H04J 1/02](#) takes precedence; FM without multiplex [H04B 1/00](#) , [H04B 14/006](#) , [H04B 15/00](#) ; PSK [H04L 5/12](#) ; impulse-modulation without multiplex [H04B 14/02](#) ; time-division multiplexing for data transmission [H04L 5/22](#) ; telemetry [G08C 15/06](#) to [G08C 15/12](#) ; telephony [H04Q 11/00](#) , [H04Q 11/04](#) , [H04Q 11/0407](#))
- H04J 3/00** **Time-division multiplex systems** ([H04J 14/00](#) takes precedence; relay systems [H04B 7/14](#) ; selecting techniques [H04Q](#))
- H04J 3/02 . Details (electronic switching or gating [H03K 17/00](#))
- H04J 3/025 .. {Filter arrangements ([H04J 3/08](#) takes precedence; filters per se [H03H 7/00](#) , [H03H 9/00](#))}
- H04J 3/04 .. Distributors combined with modulators or demodulators {(pulse distributors in general [H03K 5/15](#) ; pulse counters [H03K 21/00](#) to [H03K 29/06](#) ; for telegraphy [H04L 5/22](#) , [H04L 13/00](#) to [H04L 23/00](#) , [H04L 25/45](#) ; for telephony [H04Q 11/04](#))}
- H04J 3/042 ... {Distributors with electron or gas discharge tubes}
- H04J 3/045 ... {Distributors with CRT}
- H04J 3/047 ... {Distributors with transistors or integrated circuits}
- H04J 3/06 .. Synchronising arrangements {(for television systems [H04N 5/04](#) ; bit-synchronisation [H04L 7/00](#))}
- H04J 3/0602 ... {Systems characterised by the synchronising information used}
- H04J 3/0605 .... {Special codes used as synchronising signal}
- H04J 3/0608 ..... {Detectors therefor, e.g. correlators, state machines}
- H04J 3/0611 ..... {PN codes ([H04J 3/0608](#) takes precedence)}
- H04J 3/0614 .... {the synchronising signal being characterised by the amplitude, duration or polarity}
- H04J 3/0617 .... {the synchronising signal being characterised by the frequency or phase}
- H04J 3/062 ... {Synchronisation of signals having the same nominal but fluctuating bit rates, e.g. using buffers (pulse-stuffing [H04J 3/07](#) ; asynchronous-synchronous conversion [H04L 5/24](#) ; speed conversion [H04L 25/05](#) ; speed conversion in computers [G06F 5/06](#))}
- H04J 3/0623 .... {Synchronous multiplexing systems, e.g. synchronous digital hierarchy/ synchronous optical network (SDH/SONET), synchronisation with a pointer process}
- H04J 3/0626 .... {plesiochronous multiplexing systems, e.g. plesiochronous digital hierarchy (PDH), jitter attenuators}
- H04J 3/0629 ..... {in a network, e.g. in combination with switching or multiplexing, slip buffers}
- H04J 3/0632 .... {Synchronisation of packets and cells, e.g. transmission of voice via a packet network, circuit emulation service (CES)}
- H04J 3/0635 ... {Clock or time synchronisation in a network (timer in protocols [H04L 69/28](#))}
- H04J 3/0638 .... {Clock or time synchronisation among nodes; Internode synchronisation (synchronization for ring networks [H04L 12/422](#) ; data switching networks with synchronous transmission [H04L 12/43](#))}
- H04J 3/0641 ..... {Change of the master or reference, e.g. take-over or failure of the master}
- H04J 3/0644 ..... {External master-clock}

H04J 3/0647	.....	{Synchronisation among TDM nodes}
H04J 3/065	.....	{using timestamps}
H04J 3/0652	.....	{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 <a href="#">H04L 12/4035</a> )}
H04J 3/0655	.....	{using timestamps}
H04J 3/0658	.....	{Clock or time synchronisation among packet nodes}
H04J 3/0661	.....	{using timestamps}
H04J 3/0664	.....	{unidirectional timestamps}
H04J 3/0667	.....	{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 <a href="#">H04L 12/2657</a> )}
H04J 3/067	.....	{Details of the timestamp structure}
H04J 3/0673	.....	{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}
H04J 3/0676	....	{Mutual}
H04J 3/0679	....	{by determining clock distribution path in a network}
H04J 3/0682	....	{by delay compensation, e.g. by compensation of propagation delay or variations thereof, by ranging}
H04J 3/0685	....	{Clock or time synchronisation in a node; Intranode synchronisation}
H04J 3/0688	.....	{Change of the master or reference, e.g. take-over or failure of the master}
H04J 3/0691	.....	{Synchronisation in a TDM node}
H04J 3/0694	.....	{Synchronisation in a TDMA node, e.g. TTP}
H04J 3/0697	.....	{Synchronisation in a packet node}
H04J 3/07	...	using pulse stuffing for systems with different or fluctuating information rates {or bit rates}
H04J 3/073	....	{Bit stuffing, e.g. PDH}
H04J 3/076	....	{Bit and byte stuffing, e.g. SDH/PDH desynchronisers, bit-leaking}
H04J 3/08	..	Intermediate station arrangements, e.g. for branching, for tapping-off
H04J 3/085	...	{for ring networks, e.g. SDH/SONET rings, self-healing rings, meshed SDH/SONET networks}
H04J 3/10	..	Arrangements for reducing cross-talk between channels
H04J 3/12	..	Arrangements providing for calling or supervisory signals
H04J 3/125	...	{One of the channel pulses or the synchronisation pulse is also used for transmitting monitoring or supervisory signals}
H04J 3/14	..	Monitoring arrangements {(for SDH/SONET rings <a href="#">H04J 3/085</a> )}
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 ( <a href="#">H04J 3/17</a> , <a href="#">H04J 3/24</a> take precedence)
H04J 3/1605	..	{Fixed allocated frame structures}
H04J 3/1611	...	{Synchronous digital hierarchy [SDH] or SONET ( <a href="#">H04J 3/1664</a> takes precedence for interactions with OTN)}

H04J 3/1617	....	{carrying packets or ATM cells}
H04J 3/1623	...	{Plesiochronous digital hierarchy (PDH)}
H04J 3/1629	....	{Format building algorithm}
H04J 3/1635	....	{Format conversion, e.g. CEPT/US}
H04J 3/1641	....	{Hierarchical systems}
H04J 3/1647	....	{Subrate or multislot multiplexing}
H04J 3/1652	...	{Optical Transport Network (OTN)}
H04J 3/1658	....	{carrying packets or ATM cells; <a href="#">H04J 3/1664</a> takes precedence for payloads with different packet types}
H04J 3/1664	....	{carrying hybrid payloads, e.g. different types of packets or carrying frames and packets in the payload}
H04J 3/167	....	{interaction with SDH/SONET, e.g. carrying SDH/SONET frames, interfacing with SDH/SONET; <a href="#">H04J 3/1664</a> takes precedence}
H04J 3/1676	..	{Time-division multiplex with pulse-position, pulse-interval, or pulse-width modulation}
H04J 3/1682	..	{Allocation of channels according to the instantaneous demands of the users, e.g. concentrated multiplexers, statistical multiplexers}
H04J 3/1688	...	{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 <a href="#">H04B 1/66</a> ; in PCM-systems <a href="#">H04B 14/046</a> ; removal of redundancy in telegraph communication <a href="#">H03M 7/30</a> )}
H04J 3/1694	..	{Allocation of channels in TDM/TDMA networks, e.g. distributed multiplexers (Passive Optical Networks <a href="#">H04Q 11/0062</a> )}
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 {(speech analysis or identification <a href="#">G10L</a> )}
H04J 3/172	..	{Digital speech interpolation, i.e. DSI}
H04J 3/175	..	{Speech activity or inactivity detectors (echo suppressors <a href="#">H04B 3/20</a> )}
H04J 3/177	..	{Freeze-out systems, e.g. taking away active sources from transmission}
H04J 3/18	.	using frequency compression and subsequent expansion of the individual signals
H04J 3/20	.	using resonant transfer
H04J 3/22	.	in which the sources have different rates or codes {(simultaneous speech and digital data or video transmission <a href="#">H04M 11/06</a> ; see provisional also <a href="#">H04J 3/16</a> )}
H04J 3/24	.	in which the allocation is indicated by an address {the different channels being transmitted sequentially }(H04J 3/17 takes precedence; in computers <a href="#">G06F 12/00</a> , <a href="#">G06F 13/00</a> { code multiplex systems <a href="#">H04J 13/00</a> ; selecting techniques <a href="#">H04Q</a> ; relay systems <a href="#">H04B 7/14</a> )}
H04J 3/242	..	{the frames being of variable length}
H04J 3/245	..	{in which the allocation protocols between more than two stations share the same transmission medium (stations for satellite systems <a href="#">H04B 7/185</a> )}
H04J 3/247	..	{ATM or packet multiplexing}
H04J 3/26	..	in which the information and the address are simultaneously transmitted
<b>H04J 4/00</b>		<b>Combined time-division and frequency-division multiplex systems</b> ( <a href="#">H04J 13/00</a> takes precedence; { data transmission <a href="#">H04L 5/26</a> ; telemetry <a href="#">G08C 15/00</a> )}

- H04J 4/005 . {Transmultiplexing}
- H04J 7/00** **Multiplex systems in which the amplitudes or durations of the signals in individual channels are characteristic of those channels**
- H04J 7/02 . in which the polarity of the amplitude is characteristic
- H04J 9/00** **Multiplex systems in which each channel is represented by a different type of modulation of the carrier**
- H04J 11/00** **Orthogonal multiplex systems,{e.g. using WALSH codes }(H04J 13/00 takes precedence)**
- H04J 2011/0003 . {Combination with other multiplexing techniques}
- H04J 2011/0006 . . {with CDM/CDMA}
- H04J 2011/0009 . . {with FDM/FDMA}
- H04J 2011/0013 . . {with TDM/TDMA}
- H04J 2011/0016 . . {with FDM/FDMA and TDM/TDMA}
- H04J 2011/002 . . {Delay multiplexing}
- H04J 11/0023 . {Interference mitigation or co-ordination (traffic scheduling [H04W 72/082](#) , [H04W 72/1226](#) ; power management [H04W 52/00](#) ; allocation criteria for ingress interference avoidance [H04L 5/0062](#) ; frequency allocation criteria for requirements on out-of-channel emissions [H04L 5/0066](#) ; peak power aspects in multicarrier modulation [H04L 27/2614](#) ; arrangements for removing intersymbol interference or baseband equalisers [H04L 25/03006](#) ; direct sequence spread spectrum [DSSS] systems [H04B 1/7097](#) ; frequency hopping [H04B 1/713](#))}
- H04J 11/0026 . . {of multi-user interference}
- H04J 11/003 . . . {at the transmitter (transmission to multiple receive units in multiple input multiple output (MIMO) [H04B 7/0452](#) ; transmit antenna weighting [H04B 7/0615](#))}
- H04J 11/0033 . . . . {by pre-cancellation of known interference, e.g. using a matched filter, dirty paper coder or Tomlinson-Harashima precoder (correlative coding in synchronous or start-stop systems [H04L 25/497](#))}
- H04J 11/0036 . . . {at the receiver}
- H04J 11/004 . . . . {using regenerative subtractive interference cancellation}
- H04J 11/0043 . . . . . {by grouping or ordering the users}
- H04J 11/0046 . . . . {using joint detection algorithms}
- H04J 11/005 . . {of intercell interference}
- H04J 11/0053 . . . {using co-ordinated multipoint transmission/reception (co-ordinated antenna or beam-forming aspects [H04B 7/022](#))}
- H04J 11/0056 . . . {Inter-base station aspects}
- H04J 11/0059 . . . {Out-of-cell user aspects}
- H04J 11/0063 . . {of multipath interference, e.g. Rake receivers}
- H04J 11/0066 . . {of narrowband interference (narrowband interference reduction [H04B 1/1036](#))}

- H04J 11/0069 . {Cell search, i.e. determining cell identity [cell-ID] (design of multiplexing codes [H04J 13/00](#) ; processing access restriction or access information [H04W 48/16](#) ; discovery of network devices for network data management [H04W 8/005](#) ; sounding signals for channel estimation [H04L 25/0226](#) ; structure of reference signals in multicarrier modulation systems [H04L 27/2613](#) ; frame, time or carrier synchronisation in multicarrier modulation systems [H04L 27/2655](#))}
- H04J 11/0073 . . {Acquisition of primary synchronisation channel, e.g. detection of cell-ID within cell-ID group}
- H04J 11/0076 . . {Acquisition of secondary synchronisation channel, e.g. detection of cell-ID group}
- H04J 11/0079 . . {Acquisition of downlink reference signals, e.g. detection of cell-ID}
- H04J 11/0083 . . {Multi-mode cell search, i.e. where several modes or systems can be used, e.g. backwards compatible, dual mode or flexible systems}
- H04J 11/0086 . . {Search parameters, e.g. search strategy, accumulation length, range of search, thresholds (code acquisition in DSSS [H04B 1/7075](#))}
- H04J 11/0089 . . {Search hardware arrangements, e.g. sharing of correlators to reduce complexity}
- H04J 11/0093 . . {Neighbour cell search}
- H04J 2011/0096 . {Network synchronisation}

**H04J 13/00****Code division multiplex systems** (for frequency hopping [H04B 1/713](#))**NOTE**

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](#) .

- H04J 13/0003 . {Code application, i.e. aspects relating to how codes are applied to form multiplexed channels}
- H04J 13/0007 . {Code type}

**NOTE**

Code type information should be classified in addition to other relevant aspects. This should also be done in cases where the other relevant symbol refers to code type, e.g. [H04J 13/14](#) , [H04J 13/20](#) )

- H04J 13/0011 . . {Complementary}
- H04J 13/0014 . . . {Golay}
- H04J 13/0018 . . {Chaotic}
- H04J 13/0022 . . {PN, e.g. Kronecker}
- H04J 13/0025 . . . {M-sequences}
- H04J 13/0029 . . . {Gold}
- H04J 13/0033 . . . {Kasami}
- H04J 2013/0037 . . {Multilevel codes}
- H04J 13/004 . . {Orthogonal}
- H04J 13/0044 . . . {OVSF [orthogonal variable spreading factor]}
- H04J 13/0048 . . . {Walsh}

H04J 13/0051	...	{Orthogonal gold}
H04J 13/0055	..	{ZCZ [zero correlation zone]}
H04J 13/0059	...	{CAZAC [constant-amplitude and zero auto-correlation]}
H04J 13/0062	....	{Zadoff-Chu}
H04J 13/0066	....	{GCL [generalized chirp-like] sequences}
H04J 13/007	...	{LAS, i.e. LA, LS and LAS codes}
H04J 13/0074	.	{Code shifting or hopping}
H04J 13/0077	.	{Multicode, e.g. multiple codes assigned to one user}
H04J 2013/0081	..	{with FDM/FDMA}
H04J 2013/0085	..	{with TDM/TDMA}
H04J 2013/0088	..	{with FDM/FDMA and TDM/TDMA}
H04J 2013/0092	..	{Delay multiplexing}
H04J 2013/0096	.	{Network synchronisation}
H04J 13/10	.	Code generation
H04J 13/102	..	{Combining codes}
H04J 13/105	...	{by extending}
H04J 13/107	...	{by concatenation}
H04J 13/12	..	Generation of orthogonal codes
H04J 13/14	..	Generation of codes with a zero correlation zone
H04J 13/16	.	Code allocation
H04J 2013/165	..	{Joint allocation of code together with frequency or time}
H04J 13/18	..	Allocation of orthogonal codes
H04J 13/20	...	having an orthogonal variable spreading factor [OVSF]
H04J 13/22	..	Allocation of codes with a zero correlation zone
<b>H04J 14/00</b>		<b>Optical multiplex systems</b> (optical coupling, mixing or splitting, per se <a href="#">G02B</a> )
H04J 14/002	.	{Coherencemultiplexing}
H04J 14/005	.	{Optical Code Multiplex}
H04J 14/007	..	{Orthogonal Optical Code Multiplex}
H04J 14/02	.	Wavelength-division multiplex systems
H04J 14/0201	..	{Add-and-drop multiplexing}
H04J 14/0202	...	{Arrangements therefor}
H04J 14/0204	....	{Broadcast and select arrangements, e.g. with an optical splitter at the input before adding or dropping}
H04J 14/0205	....	{Select and combine arrangements, e.g. with an optical combiner at the output after adding or dropping}
H04J 14/0206	....	{Express channels arrangements}
H04J 14/0208	....	{Interleaved arrangements}
H04J 14/0209	....	{Multi-stage arrangements, e.g. by cascading multiplexers or demultiplexers}
H04J 14/021	....	{Reconfigurable arrangements, e.g. reconfigurable optical add/drop multiplexers [ROADM] or tunable optical add/drop multiplexers [TOADM]}



H04J 14/0212	.....	{using optical switches or wavelength selective switches [WSS]}
H04J 14/0213	....	{Groups of channels or wave bands arrangements}
H04J 14/0215	...	{Architecture aspects}
H04J 14/0216	....	{Bidirectional architectures}
H04J 14/0217	....	{Multi-degree architectures, e.g. having a connection degree greater than two}
H04J 14/0219	....	{Modular or upgradable architectures}
H04J 14/022	....	{For interconnection of WDM optical networks}
H04J 14/0221	..	{Power control, e.g. to keep the total optical power constant}
H04J 14/0223	..	{Conversion to or from optical TDM}
H04J 14/0224	..	{Irregular wavelength spacing, e.g. to accomodate interference to all wavelengths}
H04J 14/0226	..	{Fixed carrier allocation, e.g. according to service}
H04J 14/0227	..	{Operation, administration, maintenance or provisioning [OAMP] of WDM network, e.g. media access, routing or wavelength allocation ( <a href="#">monitoring of optical transmission parameters in general H04B 10/07</a> )}
H04J 14/0228	...	{Wavelength allocation for communications one to all, e.g. broadcasting wavelengths}
H04J 14/023	....	{in WDM passive optical networks [WDM-PON]}
H04J 14/0231	.....	
H04J 14/0232	.....	{for downstream transmission}
H04J 14/0234	.....	{using multiple wavelengths}
H04J 14/0235	.....	{for upstream transmission}
H04J 14/0236	.....	{using multiple wavelengths}
H04J 14/0238	...	{Wavelength allocation for communications one to many, e.g. multicasting wavelengths}
H04J 14/0239	....	{in WDM-PON sharing multiple downstream wavelengths for groups of optical network units [ONU], e.g. multicasting wavelengths}
H04J 14/0241	...	{Wavelength allocation for communications one to one, e.g. unicasting wavelengths}
H04J 14/0242	....	{in WDM-PON}
H04J 14/0243	.....	
H04J 14/0245	.....	{for downstream transmission, e.g. optical line terminal [OLT] to ONU}
H04J 14/0246	.....	{using one wavelength per ONU}
H04J 14/0247	.....	{Sharing one wavelength for at least a group of ONU's}
H04J 14/0249	.....	{for upstream transmission, e.g. ONU to OLT or ONU to ONU}
H04J 14/025	.....	{using one wavelength per ONU, e.g. for transmissions from ONU to OLT or from ONU to ONU}
H04J 14/0252	.....	{Sharing one wavelength for at least a group of ONU's, e.g. for transmissions from ONU to OLT or from ONU to ONU}
H04J 2014/0253	.....	{Allocation of downstream wavelengths for upstream transmission ( <a href="#">optical transmission using a single light source for multiple stations H04B 10/2587</a> )}
H04J 14/0254	...	{Optical medium access}



H04J 14/0256	....	{at the optical channel layer}
H04J 14/0257	.....	{Wavelength assignment algorithms}
H04J 14/0258	.....	{Wavelength identification or wavelength labeling}
H04J 14/026	.....	{using WDM channels of different transmission rates}
H04J 14/0261	....	{at the optical multiplex section layer}
H04J 14/0263	.....	{Multiplex section layer wavelength assignment algorithms}
H04J 14/0264	.....	{Multiplex identification or labelling}
H04J 14/0265	.....	{Multiplex arrangements in bidirectional systems, e.g. interleaved allocation of wavelengths or allocation of wavelength groups}
H04J 14/0267	....	{Optical signalling or routing, (routing in packet switched systems <a href="#">H04L 12/5689</a> )}
H04J 14/0268	.....	{Restoration of optical paths, e.g. p-cycles (route fault recovery in packet switched systems <a href="#">H04L 45/28</a> )}
H04J 14/0269	.....	{using tables for routing (organization of routing tables in packet switched systems <a href="#">H04L 45/54</a> )}
H04J 14/0271	.....	{Impairment aware routing}
H04J 14/0272	....	{Transmission of OAMP information (using a supervisory or additional signal for monitoring of optical transmission parameters in general <a href="#">H04B 10/077</a> )}
H04J 14/0273	.....	{using optical overhead, e.g. overhead processing}
H04J 14/0275	.....	{using an optical service channel}
H04J 14/0276	.....	{using pilot tones}
H04J 14/0278	..	{WDM optical network architectures}
H04J 14/0279	...	{WDM point-to-point architectures}
H04J 14/028	...	{WDM bus architectures}
H04J 14/0282	...	{WDM tree architectures}
H04J 14/0283	...	{WDM ring architectures}
H04J 14/0284	...	{WDM mesh architectures}
H04J 14/0286	...	{WDM hierarchical architectures}
H04J 14/0287	..	{Protection in WDM systems}
H04J 14/0289	...	{Optical multiplex section protection}
H04J 14/029	....	{Dedicated protection at the optical multiplex section (1+1)}
H04J 14/0291	....	{Shared protection at the optical multiplex section (1:1, n:m)}
H04J 14/0293	...	{Optical channel protection}
H04J 14/0294	....	{Dedicated protection at the optical channel (1+1)}
H04J 14/0295	....	{Shared protection at the optical channel (1:1, n:m)}
H04J 14/0297	...	{Optical equipment protection}
H04J 14/0298	..	{with sub-carrier multiplexing (SCM)}
H04J 14/04	.	Mode multiplex systems
H04J 14/06	.	Polarisation multiplex systems
H04J 14/08	.	Time-division multiplex systems
H04J 14/083	..	{Add and drop multiplexing}

H04J 14/086 .. {Medium access ([H04J 3/16](#) takes precedence)}

**H04J 15/00** **Multiplex systems not otherwise provided for**

**H04J 2203/00** **Aspects of optical multiplex systems other than those covered by [H04J 14/00](#)**

- H04J 2203/0001 . Provisions for broadband connections in integrated services digital network using frames of the Optical Transport Network (OTN) or using synchronous transfer mode (STM), e.g. SONET, SDH
  - H04J 2203/0003 .. Switching fabrics, e.g. transport network, control network
    - H04J 2203/0005 ... Switching elements
      - H04J 2203/0007 .... Space switch details
      - H04J 2203/0008 .... Time switch details
      - H04J 2203/001 .... using a shared central buffer
    - H04J 2203/0012 ... Switching modules and their interconnections
      - H04J 2203/0014 .... Clos
      - H04J 2203/0016 .... Crossbar
      - H04J 2203/0017 .... Parallel switch planes
    - H04J 2203/0019 ... Multicast/broadcast capabilities
    - H04J 2203/0021 ... Control mechanisms
    - H04J 2203/0023 ... Routing/path finding
    - H04J 2203/0025 ... Peripheral units
    - H04J 2203/0026 ... Physical details
  - H04J 2203/0028 .. Local loop
    - H04J 2203/003 ... Medium of transmission, e.g. fibre, cable, radio
      - H04J 2203/0032 .... Fibre
      - H04J 2203/0033 .... Metallic
      - H04J 2203/0035 .... Radio
      - H04J 2203/0037 .... Satellite
    - H04J 2203/0039 ... Topology
      - H04J 2203/0041 .... Star, e.g. cross-connect, concentrator, subscriber group equipment, remote electronics
      - H04J 2203/0042 .... Ring
      - H04J 2203/0044 .... Bus, e.g. DQDB
  - H04J 2203/0046 .. User Network Interface
    - H04J 2203/0048 ... Network termination, e.g. NT1, NT2, PBX
    - H04J 2203/005 ... Terminal equipment, e.g. codecs, synch
  - H04J 2203/0051 .. Network Node Interface, e.g. tandem connections, transit switching
    - H04J 2203/0053 ... Routing
    - H04J 2203/0055 ... Network design, dimensioning, topology or optimisation
  - H04J 2203/0057 .. Operations, administration and maintenance (OAM)
    - H04J 2203/0058 ... Network management, e.g. Intelligent nets
    - H04J 2203/006 ... Fault tolerance and recovery

H04J 2203/0062	..	Testing
H04J 2203/0064	..	Admission Control
H04J 2203/0066	...	Signalling, e.g. protocols, reference model
H04J 2203/0067	...	Resource management and allocation
H04J 2203/0069	....	Channel allocation
H04J 2203/0071	....	Monitoring
H04J 2203/0073	..	Services, e.g. multimedia, GOS, QOS
H04J 2203/0075	...	Connection-oriented
H04J 2203/0076	...	Channel characteristics, e.g. BER, error detection, error correction, delay, jitter
H04J 2203/0078	...	Support of N-ISDN
H04J 2203/008	...	Support of video
H04J 2203/0082	...	Interaction of SDH with non-ATM protocols
H04J 2203/0083	....	Support of the IP protocol
H04J 2203/0085	....	Support of Ethernet
H04J 2203/0087	...	Support of voice
H04J 2203/0089	..	Multiplexing, e.g. coding, scrambling, SONET
H04J 2203/0091	...	Time slot assignment
H04J 2203/0092	...	Code Division Multiple Access (CDMA)
H04J 2203/0094	...	Virtual Concatenation
H04J 2203/0096	...	Serial Concatenation
H04J 2203/0098	..	Traffic aspects, e.g. arbitration, load balancing, smoothing, buffer management
<b>H04J 2211/00</b>		<b>Orthogonal indexing scheme relating to orthogonal multiplex systems</b>
H04J 2211/001	.	using small cells within macro cells e.g. femto, pico or micro cells
H04J 2211/003	.	within particular systems or standards
H04J 2211/005	..	Long term evolution (LTE)
H04J 2211/006	..	Single carrier frequency division multiple access (SC FDMA)
H04J 2211/008	..	Interleaved frequency division multiple access (IFDMA)