The following classification changes will be effected by this order:

Abolished: NONE

Established:

E-Subclasses: 714

<table>
<thead>
<tr>
<th>Class</th>
<th>Subclass</th>
<th>Art</th>
<th>Unit</th>
<th>Ex’r Search</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2113 and 2133</td>
<td></td>
<td>OS0001</td>
<td></td>
</tr>
</tbody>
</table>

No other classes were impacted by this order.

A. CLASSIFICATION MANUAL CHANGES

D. DEFINITION CHANGES AND NEW OR ADDITIONAL DEFINITIONS
DATA PROCESSING SYSTEM ERROR OR FAULT HANDLING

1. Reliability and availability
   - Fault recovery
     - By masking or reconfiguration
       - Of network
       - Of memory or peripheral subsystem
         - Redundant stored data accessed (e.g., duplicated data, error correction coded data, or other parity-type data)
         - Reconfiguration (e.g., adding a replacement storage component)
         - Isolating failed storage location (e.g., sector remapping)
         - Access processor affected (e.g., I/O processor, MMU, DMA processor)
       - Of processor
         - Concurrent, redundantly operating processors
         - Synchronization maintenance of processors
         - Prepared backup processor (e.g., initializing cold backup) or updating backup processor (e.g., by checkpoint message)
       - Of power supply
         - State recovery (i.e., process or data file)
       - Forward recovery (e.g., redoing committed action)
       - Reexecuting single instruction or bus cycle
       - Transmission data record (e.g., for retransmission)
       - Undo record
         - Plural recovery data sets containing set interrelationship data (e.g., time values or log record numbers)
       - State validity check
         - With power supply status monitoring
       - Resetting processor
         - Safe shutdown
       - Fault locating (i.e., diagnosis or testing)
         - Artificial intelligence (e.g., diagnostic expert system)
         - Particular access structure
         - Substituted emulative component (e.g., emulator microprocessor)
         - Memory emulator feature
       - Built-in hardware for diagnosing or testing within-system component (e.g., microprocessor test mode circuit, scan path)
       - Additional processor for in-system fault locating (e.g., distributed diagnosis program)
       - Particular stimulus creation
         - Derived from analysis (e.g., of a specification or by stimulation)
         - Halt, clock, or interrupt signal (e.g., freezing, hardware breakpoint, single-stepping)

2. Additional
   - Substituted or added instruction (e.g., code instrumenting, breakpoint instruction)
   - Test sequence at power-up or initialization
   - Analysis (e.g., of output, state, or design)
   - Of computer software
   - Monitor recognizes sequence of events (e.g., protocol or logic state analyzer)
   - Component dependent technique
   - For reliability enhancing component (e.g., testing backup spare, or fault injection)
   - Memory or storage device component fault
   - Bus, I/O channel, or network path component fault
   - Peripheral device component fault
   - Output recording (e.g., signature or trace)
   - Operator interface for diagnosing or testing
   - Performance monitoring for fault avoidance
   - Error detection or notification
   - State error (i.e., content of instruction, data, or message)
   - State out of sequence
   - Control flow state sequence monitored (e.g., watchdog processor for control-flow checking)
   - Error checking code
   - Address error
   - Storage content error
   - Timing error (e.g., watchdog timer time-out)
   - Bus or I/O channel device fault
   - Error forwarding and presentation (e.g., operator console, error display)
   - Pulse or data error handling
     - Skew detection correction
     - Data formatting to improve error detection correction capability
     - Memory access (e.g., address permutation)
     - Testing of error-check system
     - Error count or rate
     - Pseudo-error rate
     - Up-down counter
     - Synchronization control
     - Shutdown or establishing system parameter (e.g., transmission rate)
     - Data pulse evaluation/bit decision
     - Replacement of memory spare location, portion, or segment
     - Spare row or column
     - Transmission facility testing
PULSE OR DATA ERROR HANDLING

713 Transmission facility testing
714 .For channel having repeater
715 .By tone signal
716 .Test pattern with comparison
717 .Loop-back
718 .Loop or ring configuration
719 .Memory testing
720 .Read-in with read-out and compare
721 .Special test pattern (e.g., checkerboard, walking ones)
722 .Electrical parameter (e.g., threshold voltage)
723 .Performing arithmetic function on memory contents
724 .Error mapping or logging
725 .Programmable logic array (PLA) testing
726 .Scan path testing (e.g., Level sensitive scan design (LSSD))
727 .Boundary scan
728 .Random pattern generation (includes pseudorandom pattern)
729 .Plural scan paths
730 .Addressing
731 .Clock or synchronization
732 .Signature analysis
733 .Built-in testing circuit (BILBO)
734 .Structural (in-circuit test)
735 .Device response compared to input pattern
736 .Device response compared to expected fault-free response
737 .Device response compared to fault dictionary/truth table
738 .Including test pattern generator
739 .Random pattern generation (includes pseudorandom pattern)
740 .Having analog signal
741 .Simulation
742 .Testing specific device
743 .Addressing
744 .Clock or synchronization
745 .Determination of marginal operation limits
746 .Digital data error correction
747 .Substitution of previous valid data
748 .Request for retransmission
749 .Retransmission if no ACK returned
750 .Feedback to transmitter for comparison
751 .Including forward error correction capability
752 .Forward correction by block code
753 .Double error correcting with single error correcting code
754 .Error correction during refresh cycle
755 .Double encoding codes (e.g., product, concatenated)
756 .Cross-interleave Reed-Solomon code (CIRC)
757 .Parallel generation of check bits

758 Error correcting code with additional error detection code (e.g., cyclic redundancy character, parity)
759 Look-up table encoding or decoding
760 Threshold decoding (e.g., majority logic)
761 Random and burst error correction
762 Burst error correction
763 Memory access
764 Error correct and restore
765 Error pointer
766 Check bits stored in separate area of memory
767 Code word for plural n-bit (n>1)
storage units (e.g., x4 DRAM's)
768 Error correction code for memory address
769 Dynamic data storage
770 Disk array
771 Tape
772 Code word parallel access
773 Solid state memory
774 Adaptive error-correcting capability
775 Synchronization
776 For packet or frame multiplexed data
777 Hamming code
778 Nonbinary data (e.g., ternary)
779 Variable length data
780 Using symbol reliability information (e.g., soft decision)
781 Code based on generator polynomial
782 Bose-Chaudhuri-Hocquenghem code
783 Golay code
784 Reed-Solomon code
785 Syndrome computed
786 Forward error correction by tree code (e.g., convolutional)
787 Random and burst errors
788 Burst error
789 Synchronization
790 Puncturing
791 Sequential decoder (e.g., Fano or stack algorithm)
792 Trellis code
793 Syndrome decodable (e.g., self orthogonal)
794 Maximum likelihood
795 Viterbi decoding
796 Branch metric calculation
797 Majority decision/voter circuit
798 Error detection for synchronization control
799 Error/fault detection technique
800 Parity bit
801 Parity generator or checker circuit detail
802 Even and odd parity
803 Parity prediction
804 Plural dimension parity check
805 Storage accessing (e.g., address parity check)
806 Constant-ratio code (m/n)
CLASS 714 ERROR DETECTION/CORRECTION AND FAULT DETECTION/RECOVERY

PULSE OR DATA ERROR HANDLING

Error/fault detection technique

- Check character
- Modulo-n residue check character
- Code constraint monitored
- Multilevel coding (n>2)
- Forbidden combination or improper condition
- Specified digital signal or pulse count
- Two key-down detector
- Data timing/clocking
- Time delay/interval monitored
- Two-rail logic
- Noise level
- Missing-bit/drop-out detection
- Comparison of data
- Plural parallel devices of channels
- Transmission facility
- Sequential repetition
- True and complement data
- Device output compared to input

E-SUBCLASSES

The following subclasses beginning with the letter E are E-subclasses. Each E-subclass corresponds in scope to a classification in a foreign classification system, for example, the European Classification system (ECLA). The foreign classification equivalent to an E-subclass is identified in the subclass definition. In addition to U.S. documents classified in E-subclasses by U.S. patent examiners, documents are regularly classified in E-subclasses according to the classification practices of any foreign offices identified in parentheses at the end of the title. For example, *EPO* at the end of a title indicates both European and U.S. patent documents, as classified by the EPO, are regularly added to the subclass. E-subclasses may contain subject matter outside the scope of this class. Consult the E-subclass definitions, or the documents themselves, to clarify or interpret titles.

* E11.001 ERROR DETECTION; ERROR CORRECTION; MONITORING (EPO)
* E11.002 Error detection other than by redundancy in data representation, operation, or hardware, or by checking the order of processing (EPO)
* E11.003 By time limit, i.e., time-out (EPO)
* E11.004 By count or rate limit, e.g., word- or bit count limit, etc. (EPO)
* E11.005 By other limits, e.g., analog values, etc. (EPO)
* E11.006 By bit configuration check, e.g., of formats or tags, etc. (EPO)

* E11.007 Error correction, recovery or fault tolerance using at least two different redundancy techniques and at least one technique not involving redundancy (EPO)
* E11.008 Fault tolerant software (EPO)
* E11.009 In regular structures, i.e., all of the systems nodes have the same number of connections per node (EPO)
* E11.01 Interconnection networks, i.e., comprising interconnecting link and switching elements (EPO)
* E11.011 Fault-tolerant routing (EPO)
* E11.012 In rings and buses (EPO)
* E11.013 In n-dimensional structures, e.g., arrays, trees, cubes, etc. (EPO)
* E11.014 Neural networks (EPO)
* E11.015 By degradation, i.e., a slow-down occurs but full processing capability is maintained, e.g., discarding a faulty element or unit, etc. (EPO)
* E11.016 In systems, e.g., multiprocessors, etc. (EPO)
* E11.017 Security measures, i.e., ensuring safe condition in the event of error, e.g., for controlling element (EPO)
* E11.018 Protecting against parasitic influences, e.g., noise, temperatures, etc. (EPO)
* E11.019 Identification, e.g., of a performed repair, of a defined circuit, etc. (EPO)
* E11.02 Reliability or availability analysis (EPO)
* E11.021 Responding to the occurrence of a fault, e.g., fault tolerance, etc. (EPO)
* E11.022 Error or fault processing without redundancy, i.e., by taking additional measures to deal with the error/fault (EPO)
* E11.023 Error or fault handling (EPO)
* E11.024 Error or fault detection or monitoring (EPO)
* E11.025 Error or fault reporting or logging (EPO)
* E11.026 Error or fault localization (EPO)
* E11.027 By collation, i.e., correlating different errors (EPO)
* E11.028 By identifying the faulty software code (EPO)
* E11.029 Error or fault analysis (EPO)
* E11.03 Error detection or correction by redundancy in data representation, e.g., by using checking codes, etc. (EPO)
* E11.031 Using codes with inherent redundancy, e.g., n-out-of-m codes (EPO)
* E11.032 Adding special bits or symbols to the coded information, e.g., parity check, casting out 9's or 11's, etc. (EPO)
ERROR DETECTION; ERROR CORRECTION; MONITORING (EPO)

Responding to the occurrence of a fault, e.g., fault tolerance, etc. (EPO)

Error detection or correction by redundancy in data representation, e.g., by using checking codes, etc. (EPO)

Adding special bits or symbols to the coded information, e.g., parity check, casting out 9's or 11's, etc. (EPO)

*E11.033 Using arithmetic codes i.e., codes which are preserved during operation, e.g., modulo 9 or 11 check, etc. (EPO)

*E11.034 In memories (EPO)

*E11.035 In static stores (EPO)

*E11.036 Integrated on a chip (EPO)

*E11.037 In cache or content addressable memories (EPO)

*E11.038 In sector programmable memories, e.g., flash disk, etc. (EPO)

*E11.039 In multilevel memories (EPO)

*E11.04 To protect a block of data words, e.g., CRC, checksum, etc. (EPO)

*E11.041 To protect individual data words written into, or read out of, the addressable memory subsystem of data processing equipment (EPO)

*E11.042 Codes or arrangements adapted for a specific type of error (EPO)

*E11.043 Error in accessing a memory location, i.e., addressing error (EPO)

*E11.044 Error in check bits (EPO)

*E11.045 Identification of the type of error (EPO)

*E11.046 Adjacent error, e.g., error in n-bit (n>1) wide storage units, i.e., package error, etc. (EPO)

*E11.047 Simple parity (EPO)

*E11.048 Unidirectional errors (EPO)

*E11.049 Arrangements adapted for a specific error detection or correction feature (EPO)

*E11.05 Bypassing or disabling error detection or correction (EPO)

*E11.051 Updating check bits on partial write, i.e., read/modify/write (EPO)

*E11.052 Correcting systematically all correctable errors, i.e., scrubbing (EPO)

*E11.053 Using single parity bit (EPO)

*E11.054 Error detection or correction of the data by redundancy in hardware (EPO)

*E11.055 Error detection by comparing the output signals of redundant hardware (EPO)

*E11.056 In static storage, e.g., matrix, registers, etc. (EPO)

*E11.057 In coding, decoding circuits, e.g., parity circuits (EPO)

*E11.058 In communications, e.g., transmission, interfaces, etc. (EPO)

*E11.059 Control processors, e.g., for sensors, actuators, etc. (EPO)

*E11.06 With exchange of data between units (EPO)

*E11.061 With data processors, i.e., data processors compare their computations (EPO)

*E11.062 In storage with relative movement between record-carrier and transducer, e.g., tapes, disks, etc. (EPO)

*E11.063 In systems, i.e. comprising a multiplicity of resources, e.g., cpu with its memory and I/O, etc. (EPO)

*E11.064 In arithmetic, logic or counter circuits or a combination thereof, e.g., alu, adder, etc. (EPO)

*E11.065 In I/O devices or adapters therefor (EPO)

*E11.066 Displays (EPO)

*E11.067 Timing and synchronization therein (EPO)

*E11.068 By using fault tolerant clocks (EPO)

*E11.069 Using passive fault-masking of the redundant circuits, e.g., by quadding or by majority decision circuits, etc. (EPO)

*E11.07 Synchronization thereof (EPO)

*E11.071 Using active fault-masking, e.g., by switching out faulty elements or by switching in spare elements, etc. (EPO)

*E11.072 In systems, e.g., multiprocessors, etc. (EPO)

*E11.073 In distributed systems (EPO)

*E11.074 In regular structures (EPO)

*E11.075 Array of processors, e.g., systolic arrays, etc. (EPO)

*E11.076 Hypercubes (EPO)

*E11.077 Trees (EPO)

*E11.078 In interconnections, e.g., rings, etc. (EPO)

*E11.079 Bus (EPO)

*E11.08 Data exchange between units, e.g., for updating backup units, etc. (EPO)

*E11.081 For control, e.g., actuators, etc. (EPO)

*E11.082 In arithmetic units (EPO)

*E11.083 Redundant power supplies (EPO)

*E11.084 Masking faults in storage systems using spares and/or by reconfiguring (EPO)

*E11.085 Removing defective units from operation (EPO)

*E11.086 Bypassing defective units on a serial bus (EPO)
Error Detection; Error Correction; Monitoring (EPO)
* E11.087 With address translations and modifications (EPO)
* E11.088 Handling defects in a Redundant Array of Inexpensive Disks (RAID) by remapping (EPO)
* E11.089 Managing spare storage units (EPO)
* E11.09 Hot spaces (EPO)
* E11.091 Via redundancy in hardware accessing the storage components (EPO)
* E11.092 Using redundant I/O processors, storage control units or array controllers (EPO)
* E11.093 With serial buses (EPO)
* E11.094 To file servers (EPO)
* E11.095 Connection redundancy between storage system components (EPO)
* E11.096 With serial buses (EPO)
* E11.097 To file servers (EPO)
* E11.098 Using the replication of data, e.g., with two or more copies, etc. (EPO)
* E11.099 Duplexed memories, e.g., twin boot ROMs, etc. (EPO)
* E11.1 Duplexed caches, e.g., cache paired with non-volatile storage, etc. (EPO)
* E11.101 Mirroring, i.e., the concept of maintaining data on two or more units in the same state at all times (EPO)
* E11.102 Resynchronization of failed mirrors (EPO)
* E11.103 Mirror management, e.g., pairing of units, etc. (EPO)
* E11.104 Mirroring on the same storage unit (EPO)
* E11.105 Mirroring on different storage units with a common controller (RAID 1) (EPO)
* E11.106 Mirroring with multiple controllers (EPO)
* E11.107 Asynchronous mirroring (EPO)
* E11.108 Synchronous mirroring (EPO)
* E11.109 De-clustering of replicated data (EPO)
* E11.11 Using more than two copies (EPO)
* E11.111 In Logic Arrays, e.g., programmable or iterative logic arrays, etc. (EPO)

Error detection or correction of the data by redundancy in hardware (EPO)
* E11.112 Error detection or correction of the data by redundancy in operation (EPO)
* E11.113 Saving, restoring, recovering or retrying (EPO)
* E11.114 At machine instruction level (EPO)
* E11.115 Checkpointing the instruction stream (EPO)
* E11.116 For bus or memory accesses (EPO)
* E11.117 Of application data (EPO)
* E11.118 Backing up, restoring or mirroring files or drives (EPO)
* E11.119 Backing up, i.e., point-in-time backup (EPO)
* E11.12 Hardware arrangements for backup (EPO)
* E11.121 Backup Management techniques (EPO)
* E11.122 Recovery techniques (EPO)
* E11.123 Selection of contents (EPO)
* E11.124 Scheduling policy (EPO)
* E11.125 For networked environments (EPO)
* E11.126 Nondisruptive backup (EPO)
* E11.127 Mirroring (EPO)
* E11.128 Distributed database systems; Replica control (EPO)
* E11.129 Synchronization between mobile agents and networked agents (EPO)
* E11.13 Using logs or checkpoints (EPO)
* E11.131 In transactions (EPO)
* E11.132 At operating system level (EPO)
* E11.133 Boot up procedures (EPO)
* E11.134 Reconfiguring to eliminate the error (EPO)
* E11.135 During software upgrading (EPO)
* E11.136 At file system or disk access level (EPO)
* E11.137 Restarting or rejuvenating (EPO)
* E11.138 Resetting or repowering (EPO)
* E11.139 Cleaning up resources (EPO)
* E11.14 Suspending and resuming a running system (EPO)
* E11.141 Transmit or communication errors (EPO)
* E11.142 Error detection (EPO)
* E11.143 By time redundancy (EPO)
* E11.144 Error avoidance, e.g., error spreading countermeasures, fault avoidance, etc. (EPO)
* E11.145 Detection or location of defective computer hardware by testing during standby operation or during idle time, e.g., start-up testing, etc. (EPO)
* E11.146 Verification or detection of system hardware configuration (EPO)
* E11.147 Logging of test results (EPO)
* E11.148 Test methods (EPO)
* E11.149 Power-On Test, e.g., POST, etc. (EPO)
* E11.15 Configuration test (EPO)
* E11.151 Background testing (EPO)
* E11.152 Periodic testing (EPO)
ERROR DETECTION; ERROR CORRECTION;
MONITORING (EPO)
Detection or location of defective
computer hardware by testing during
standby operation or during idle
time, e.g., start-up testing, etc. (EPO)
...Test methods (EPO)
* E11.153 ...Test trigger logic (EPO)
* E11.154 ...Marginal checking (EPO)
* E11.155 ...Testing of logic operation, e.g., by
logic analyzers, etc. (EPO)
* E11.156 ...Using Fault Dictionaries (EPO)
* E11.157 ...Using Expert Systems (EPO)
* E11.158 ...Using Neural Networks (EPO)
* E11.159 ...Functional testing (EPO)
* E11.16 ...Reconfiguring circuits for testing,
e.g., LSSD, partitioning, etc. (EPO)
* E11.161 ...Test of buses, lines or interfaces,
e.g., stuck-at or open line
failures, etc. (EPO)
* E11.162 ...Test or error correction or
detection circuits (EPO)
* E11.163 ...Test of input/output devices or
peripheral units (EPO)
* E11.164 ...Test of ALU (EPO)
* E11.165 ...Test of interrupt circuits (EPO)
* E11.166 ...Test of CPU or processors (EPO)
* E11.167 ...By simulating additional hardware,
e.g., fault simulation, (EPO)
* E11.168 ...Simulators (EPO)
* E11.169 ...Built-in tests (EPO)
* E11.17 ...Tester hardware, i.e., output
processing circuits, etc. (EPO)
* E11.171 ...Test interface between tester and
unit under test (EPO)
* E11.172 ...Using a storage for the test inputs,
e.g., test-ROM, script files,
etc. (EPO)
* E11.173 ...Remote test (EPO)
* E11.174 ...Using a dedicated service processor
for test (EPO)
* E11.175 ...With comparison between actual
response and known fault-free
response, e.g., signature
analyzers, etc. (EPO)
* E11.176 ...In multi-processor systems, e.g.,
one processor becoming the test
master, etc. (EPO)
* E11.177 ...Generation of test inputs, e.g., test
vectors, patterns or sequences,
etc. (EPO)
* E11.178 ...By checking the correct order of
processing (EPO)
* E11.179 ...Monitoring (EPO)
* E11.18 ...With visual or acoustical indication
of the functioning of the machine
(EPO)
* E11.181 ...Visualization of programs or trace
data (EPO)
* E11.182 ...Display for diagnostics, e.g.,
diagnostic result display,
self-test user interface, etc.
(EPO)
* E11.183 ...Display of waveforms, e.g., of logic
analyzers, etc. (EPO)

# Title Change
* Newly Established Subclass

OCTOBER 2007
FOREIGN ART COLLECTIONS

*********************************

FOR 000 CLASS-RELATED FOREIGN DOCUMENTS

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collections listed below. These Collections contain ONLY foreign patents or non-patent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

MEMORY TESTING (371/21.1)
DIGITAL LOGIC TESTING (371/22.1)
DIGITAL DATA ERROR CORRECTION (371/30)
FOR 100 .Scan path testing (LSSD) (371/22.3)
FOR 101 .Including test pattern generator
       (371/27)
FOR 102 .Block code (371/37.1)
FOR 103 .Memory access (371/40.1)
FOR 104 .Convolutional code (371/43)
FOR 288 ERROR/FAULT ANTICIPATION (371/4)
       .Replacement with spare device or system
       (371/8.1)
FOR 289 .Transmission facility or channel
       (371.8.2)
FOR 290 .Memory (371/10.1)
FOR 291 .Transmission facility (371/11.2)
FOR 292 .Data processor or computer (371/11.3)
DIAGNOSTIC TESTING (371/15.1)
FOR 293 .Programmable processor testing
       (371/16.1)
FOR 294 .Emulator device (371/16.2)
FOR 295 .Watchdog timer (e.g., time-out)
       (371/16.3)
FOR 296 .Processor within diverse (microwave,
       photocopier) (371/16.4)
FOR 297 .Error or fault, logging or tracking
       (371/16.5)
FOR 298 .Dedicated maintenance subsystem
       (371/18)
FOR 299 .Testing of external device by
       programmable digital computer
       (371/20)
FOR 300 ERROR DETECTION FOR SYNCHRONIZATION
       CONTROL (371/47.1)

* Title Change
* Newly Established Subclass
@ Indent Change
& Position Change
E-SUBCLASSES

The E-subclasses in U. S. Class 714 provide for processes and apparatus for detecting errors in data-processing including processes and apparatus for monitoring and evaluating data-processing equipment; processes and apparatus for correcting data-processing errors or for responding to faults in data-processing equipment; and processes and apparatus for avoiding data-processing errors and faults in data-processing equipment.

E11.001 ERROR DETECTION; ERROR CORRECTION; MONITORING (EPO):
This main group provides for processes and apparatus for the detection or correction of data-processing errors including the monitoring and evaluation of data-processing equipment. This subclass is substantially the same in scope as ECLA classification G06F11/00.

E11.002 Error detection other than by redundancy in data representation, operation, or hardware, or by checking the order of processing (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00B.

E11.003 By time limit, i.e., time-out (EPO):
This subclass is indented under subclass E11.002. This subclass is substantially the same in scope as ECLA classification G06F11/00B1.

E11.004 By count or rate limit, e.g., word- or bit count limit, etc. (EPO):
This subclass is indented under subclass E11.002. This subclass is substantially the same in scope as ECLA classification G06F11/00B2.

E11.005 By other limits, e.g., analog values, etc. (EPO):
This subclass is indented under subclass E11.002. This subclass is substantially the same in scope as ECLA classification G06F11/00B3.

E11.006 By bit configuration check, e.g., of formats or tags, etc. (EPO):
This subclass is indented under subclass E11.002. This subclass is substantially the same in scope as ECLA classification G06F11/00B5.
D. CHANGES TO THE DEFINITIONS

E11.007 Error correction, recovery or fault tolerance using at least two different redundancy techniques and at least one technique not involving redundancy (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00C.

E11.008 Fault tolerant software (EPO):
This subclass is indented under subclass E11.007. This subclass is substantially the same in scope as ECLA classification G06F11/00C1.

E11.009 In regular structures, i.e., all of the systems nodes have the same number of connections per node (EPO):
This subclass is indented under subclass E11.007. This subclass is substantially the same in scope as ECLA classification G06F11/00C4.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.074, for redundancy techniques in regular structures involving fault masking by switching in spares.

E11.01 Interconnection networks, i.e., comprising interconnecting link and switching elements (EPO):
This subclass is indented under subclass E11.009. This subclass is substantially the same in scope as ECLA classification G06F11/00C4A.

E11.011 Fault-tolerant routing (EPO):
This subclass is indented under subclass E11.009. This subclass is substantially the same in scope as ECLA classification G06F11/00C4B.

E11.012 In rings and buses (EPO):
This subclass is indented under subclass E11.009. This subclass is substantially the same in scope as ECLA classification G06F11/00C4D.

E11.013 In n-dimensional structures, e.g., arrays, trees, cubes, etc. (EPO):
This subclass is indented under subclass E11.009. This subclass is substantially the same in scope as ECLA classification G06F11/00C4C.

E11.014 Neural networks (EPO):
This subclass is indented under subclass E11.009. This subclass is substantially the same in scope as ECLA classification G06F11/00C4E.
D. CHANGES TO THE DEFINITIONS

E11.015 By degradation, i.e., a slow-down occurs but full processing capability is maintained, e.g., discarding a faulty element or unit, etc. (EPO):
This subclass is indented under subclass E11.007. This subclass is substantially the same in scope as ECLA classification G06F11/00C2.

E11.016 In systems, e.g., multiprocessors, etc. (EPO):
This subclass is indented under subclass E11.007. This subclass is substantially the same in scope as ECLA classification G06F11/00C3.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.072, for redundancy techniques in systems involving switching in spares.

E11.017 Security measures, i.e., ensuring safe condition in the event of error, e.g., for controlling element, etc. (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00D.

E11.018 Protecting against parasitic influences, e.g., etc. (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00F.

E11.019 Identification, e.g., of a performed repair, of a defined circuit, etc. (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00K.

E11.02 Reliability or availability analysis (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00M.

E11.021 Responding to the occurrence of a fault, e.g., fault tolerance, etc. (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/07.

E11.022 Error or fault processing without redundancy, i.e., by taking additional measures to deal with the error/fault (EPO):
This subclass is indented under subclass E11.021. This subclass is substantially the same in scope as ECLA classification G06F11/07P.
D. CHANGES TO THE DEFINITIONS

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.113, for retrying.

**E11.023 Error or fault handling (EPO):**
This subclass is indented under subclass E11.022. This subclass is substantially the same in scope as ECLA classification G06F11/07P10.

**E11.024 Error or fault detection or monitoring (EPO):**
This subclass is indented under subclass E11.022. This subclass is substantially the same in scope as ECLA classification G06F11/07P2.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.179 for monitoring per se.

**E11.025 Error or fault reporting or logging (EPO):**
This subclass is indented under subclass E11.022. This subclass is substantially the same in scope as ECLA classification G06F11/07P4.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.147 for logging of test results.

**E11.026 Error or fault localization (EPO):**
This subclass is indented under subclass E11.022. This subclass is substantially the same in scope as ECLA classification G06F11/07P6.

**E11.027 By collation, i.e., correlating different errors (EPO):**
This subclass is indented under subclass E11.026. This subclass is substantially the same in scope as ECLA classification G06F11/07P6C.

**E11.028 By identifying the faulty software code (EPO):**
This subclass is indented under subclass E11.026. This subclass is substantially the same in scope as ECLA classification G06F11/07P6S.

**E11.029 Error or fault analysis (EPO):**
This subclass is indented under subclass E11.022. This subclass is substantially the same in scope as ECLA classification G06F11/07P8.

**E11.03 Error detection or correction by redundancy in data representation, e.g., by using checking codes, etc. (EPO):**
This subclass is indented under subclass E11.021. This subclass is substantially the same in scope as ECLA classification G06F11/08.

**E11.031 Using codes with inherent redundancy, e.g., n-out-of-m codes, etc. (EPO):**
This subclass is indented under subclass E11.03. This subclass is substantially the same in scope as ECLA classification G06F11/08N.

**E11.032 Adding special bits or symbols to the coded information, e.g., parity check, casting out 9's or 11's, etc. (EPO):**
This subclass is indented under subclass E11.03. This subclass is substantially the same in scope as ECLA classification G06F11/10.

**E11.033 Using arithmetic codes i.e. codes which are preserved during operation, e.g., modulo 9 or 11 check, etc. (EPO):**
This subclass is indented under subclass E11.032. This subclass is substantially the same in scope as ECLA classification G06F11/10C.

**E11.034 In memories (EPO):**
This subclass is indented under subclass E11.032. This subclass is substantially the same in scope as ECLA classification G06F11/10M.

**E11.035 In static stores (EPO):**
This subclass is indented under subclass E11.034. This subclass is substantially the same in scope as ECLA classification G06F11/10M2.

**E11.036 Integrated on a chip (EPO):**
This subclass is indented under subclass E11.035. This subclass is substantially the same in scope as ECLA classification G06F11/10M2A.

**E11.037 In cache or content addressable memories (EPO):**
This subclass is indented under subclass E11.036. This subclass is substantially the same in scope as ECLA classification G06F11/10M2A1.

**E11.038 In sector programmable memories, e.g., flash disk (EPO):**
This subclass is indented under subclass E11.036. This subclass is substantially the same in scope as ECLA classification G06F11/10M2A3.

**E11.039 In multilevel memories (EPO):**
This subclass is indented under subclass E11.036. This subclass is substantially the same in scope as ECLA classification G06F11/10M2A5.
D. CHANGES TO THE DEFINITIONS

E11.04 To protect a block of data words, e.g., CRC, checksum, etc. (EPO):
This subclass is indented under subclass E11.035. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2B.

E11.041 To protect individual data words written into, or read out of, the
addressable memory subsystem of data processing equipment (EPO):
This subclass is indented under subclass E11.035. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D.

E11.042 Codes or arrangements adapted for a specific type of error (EPO):
This subclass is indented under subclass E11.041. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1.

E11.043 Error in accessing a memory location, i.e., addressing error (EPO):
This subclass is indented under subclass E11.042. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1A.

E11.044 Error in check bits (EPO):
This subclass is indented under subclass E11.042. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1C.

E11.045 Identification of the type of error (EPO):
This subclass is indented under subclass E11.042. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1D.

E11.046 Adjacent error, e.g., error in n-bit (n>1) wide storage units, i.e.,
package error, etc. (EPO):
This subclass is indented under subclass E11.042. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1P.

E11.047 Simple parity (EPO):
This subclass is indented under subclass E11.042. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1S.

E11.048 Unidirectional errors (EPO):
This subclass is indented under subclass E11.042. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D1U.

E11.049 Arrangements adapted for a specific error detection or correction
feature (EPO):
This subclass is indented under subclass E11.041. This subclass is substantially the same
in scope as ECLA classification G06F11/10M2D3.
D. CHANGES TO THE DEFINITIONS

E11.05 Bypassing or disabling error detection or correction (EPO):
This subclass is indented under subclass E11.049. This subclass is substantially the same in scope as ECLA classification G06F11/10M2D3B.

E11.051 Updating check bits on partial write, i.e., read/modify/write (EPO):
This subclass is indented under subclass E11.049. This subclass is substantially the same in scope as ECLA classification G06F11/10M2D3R.

E11.052 Correcting systematically all correctable errors, i.e., scrubbing (EPO):
This subclass is indented under subclass E11.049. This subclass is substantially the same in scope as ECLA classification G06F11/10M2D3S.

E11.053 Using single parity bit (EPO):
This subclass is indented under subclass E11.032. This subclass is substantially the same in scope as ECLA classification G06F11/10B.

E11.054 Error detection or correction of the data by redundancy in hardware (EPO):
This subclass is indented under subclass E11.021. This subclass is substantially the same in scope as ECLA classification G06F11/16.

E11.055 Error detection by comparing the output signals of redundant hardware (EPO):
This subclass is indented under subclass E11.054. This subclass is substantially the same in scope as ECLA classification G06F11/16B.

E11.056 In static storage, e.g., matrix, registers, etc. (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B1.

E11.057 In coding, decoding circuits, e.g., parity circuits, etc. (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B10.

E11.058 In communications, e.g., transmission, interfaces, etc. (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B12.

E11.059 Control processors, e.g., for sensors, actuator, etc. (EPO):
D. CHANGES TO THE DEFINITIONS

This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B14.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.081, for similar subject matter using active fault-masking.

E11.06 With exchange of data between units (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B16.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.08 for similar subject matter using active fault-masking.

E11.061 With data processors, i.e., data processors compare their computations (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B18.

E11.062 In storage with relative movement between record carrier and transducer, e.g., tapes, disks, etc. (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B2.

E11.063 In systems, i.e., comprising a multiplicity of resources, e.g., cpu with its memory and I/O, etc. (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B20.

E11.064 In arithmetic, logic or counter circuits or a combination thereof, e.g., alu, adder (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B4.

E11.065 In I/O devices or adapters therefor (EPO):
This subclass is indented under subclass E11.055. This subclass is substantially the same in scope as ECLA classification G06F11/16B8.

E11.066 Displays (EPO):
This subclass is indented under subclass E11.065. This subclass is substantially the same in scope as ECLA classification G06F11/16B8D.
D. CHANGES TO THE DEFINITIONS

E11.067 Timing and synchronization therein (EPO):
This subclass is indented under subclass E11.054. This subclass is substantially the same in scope as ECLA classification G06F11/16S.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.07 for similar subject matter using passive fault masking.

E11.068 By using fault tolerant clocks (EPO):
This subclass is indented under subclass E11.067. This subclass is substantially the same in scope as ECLA classification G06F11/16S2.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.07, for voting schemes.

E11.069 Using passive fault-masking of the redundant circuits, e.g., by quad
ding or by majority decision circuits, etc.(EPO):
This subclass is indented under subclass E11.054. This subclass is substantially the same in scope as ECLA classification G06F11/18.

E11.07 Synchronization therefor (EPO):
This subclass is indented under subclass E11.069. This subclass is substantially the same in scope as ECLA classification G06F11/18S.

E11.071 Using active fault-masking, e.g., by switching out faulty elements or by switching in spare elements, etc. (EPO):
This subclass is indented under subclass E11.054. This subclass is substantially the same in scope as ECLA classification G06F11/20.

E11.072 In systems, e.g., multiprocessors, etc. (EPO):
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20D.

E11.073 In distributed systems (EPO):
This subclass is indented under subclass E11.072. This subclass is substantially the same in scope as ECLA classification G06F11/20D1.

E11.074 In regular structures (EPO):
This subclass is indented under subclass E11.073. This subclass is substantially the same in scope as ECLA classification G06F11/20D1A.
D. CHANGES TO THE DEFINITIONS

**E11.075 Array of processors, e.g., systolic arrays, etc. (EPO):**
This subclass is indented under subclass E11.074. This subclass is substantially the same in scope as ECLA classification G06F11/20D1A1.

**E11.076 Hypercubes (EPO):**
This subclass is indented under subclass E11.074. This subclass is substantially the same in scope as ECLA classification G06F11/20D1A2.

**E11.077 Trees (EPO):**
This subclass is indented under subclass E11.074. This subclass is substantially the same in scope as ECLA classification G06F11/20D1A3.

**E11.078 In interconnections, e.g., rings, etc. (EPO):**
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20E.

**E11.079 Bus (EPO):**
This subclass is indented under subclass E11.078. This subclass is substantially the same in scope as ECLA classification G06F11/20E1.

**E11.08 Data exchange between units, e.g., for updating backup units, etc. (EPO):**
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20F.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- E11.113, for retrying.
- E11.067, for synchronization between units.

**E11.081 For control, e.g., actuators, etc. (EPO):**
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20G.

**E11.082 In arithmetic units (EPO):**
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20H.

**E11.083 Redundant power supplies (EPO):**
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20K.
D. CHANGES TO THE DEFINITIONS

E11.084 Masking faults in storage systems using spares and/or by reconfiguring (EPO):
This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20L.

E11.085 Removing defective units from operation (EPO):
This subclass is indented under subclass E11.084. This subclass is substantially the same in scope as ECLA classification G06F11/20L10.

E11.086 Bypassing defective units on a serial bus (EPO):
This subclass is indented under subclass E11.085. This subclass is substantially the same in scope as ECLA classification G06F11/20L10S.

E11.087 With address translations and modifications (EPO):
This subclass is indented under subclass E11.084. This subclass is substantially the same in scope as ECLA classification G06F11/20L2.

E11.088 Handling defects in a Redundant Array of Inexpensive Disks (RAID) by remapping (EPO):
This subclass is indented under subclass E11.087. This subclass is substantially the same in scope as ECLA classification G06F11/20L2R.

E11.089 Managing spare storage units (EPO):
This subclass is indented under subclass E11.084. This subclass is substantially the same in scope as ECLA classification G06F11/20L6.

E11.09 Hot spares (EPO):
This subclass is indented under subclass E11.089. This subclass is substantially the same in scope as ECLA classification G06F11/20L6H.

E11.091 Via redundancy in hardware accessing the storage components (EPO):
This subclass is indented under subclass E11.084. This subclass is substantially the same in scope as ECLA classification G06F11/20L8.

E11.092 Using redundant I/O processors, storage control units or array controllers (EPO):
This subclass is indented under subclass E11.091. This subclass is substantially the same in scope as ECLA classification G06F11/20L8F.

E11.093 With serial buses (EPO):
D. CHANGES TO THE DEFINITIONS

This subclass is indented under subclass E11.092. This subclass is substantially the same in scope as ECLA classification G06F11/20L8F2.

**E11.094 To file servers (EPO):**
This subclass is indented under subclass E11.092. This subclass is substantially the same in scope as ECLA classification G06F11/20L8F4.

**E11.095 Connection redundancy between storage system components (EPO):**
This subclass is indented under subclass E11.091. This subclass is substantially the same in scope as ECLA classification G06F11/20L8C.

**E11.096 With serial buses (EPO):**
This subclass is indented under subclass E11.095. This subclass is substantially the same in scope as ECLA classification G06F11/20L8C2.

**E11.097 To file servers (EPO):**
This subclass is indented under subclass E11.095. This subclass is substantially the same in scope as ECLA classification G06F11/20L8C4.

**E11.098 Using the replication of data, e.g., with two or more copies, etc. (EPO):**
This subclass is indented under subclass E11.084. This subclass is substantially the same in scope as ECLA classification G06F11/20L4.

**E11.099 Duplex memories, e.g., twin boot ROMs, etc. (EPO):**
This subclass is indented under subclass E11.098. This subclass is substantially the same in scope as ECLA classification G06F11/20L4D.

**E11.1 Duplexed caches, e.g., cashe paired with nonvolatile storage, etc. (EPO):**
This subclass is indented under subclass E11.099. This subclass is substantially the same in scope as ECLA classification G06F11/20L4D2.

**E11.101 Mirroring, i.e., the concept of maintaining data on two or more units in the same state at all times (EPO):**
This subclass is indented under subclass E11.098. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.118 for backing up data periodically.
E11.102 Resynchronization of failed mirrors (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M10.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.112, for restoring data from a backup G06F11/14.

E11.103 Mirror management, e.g., pairing of units, etc. (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M2.

E11.104 Mirroring on the same storage unit (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M4.

E11.105 Mirroring on different storage units with a common controller (RAID 1) (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M6.

E11.106 Mirroring with multiple controllers (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M8.

E11.107 Asynchronous mirroring (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M8A.

E11.108 Synchronous mirroring (EPO):
This subclass is indented under subclass E11.101. This subclass is substantially the same in scope as ECLA classification G06F11/20L4M8S.

E11.109 De-clustering of replicated data (EPO):
This subclass is indented under subclass E11.098. This subclass is substantially the same in scope as ECLA classification G06F11/20L4R.

E11.11 Using more than two copies (EPO):
This subclass is indented under subclass E11.098. This subclass is substantially the same in scope as ECLA classification G06F11/20L4S.

E11.111 In Logic Arrays, e.g., programmable or iterative logic arrays, etc. (EPO):
D. CHANGES TO THE DEFINITIONS

This subclass is indented under subclass E11.071. This subclass is substantially the same in scope as ECLA classification G06F11/20P.

**E11.112 Error detection or correction of the data by redundancy in operation (EPO):**  
This subclass is indented under subclass E11.021. This subclass is substantially the same in scope as ECLA classification G06F11/14.

**E11.113 Saving, restoring, recovering or retrying (EPO):**  
This subclass is indented under subclass E11.112. This subclass is substantially the same in scope as ECLA classification G06F11/14A.

**E11.114 At machine instruction level (EPO):**  
This subclass is indented under subclass E11.113. This subclass is substantially the same in scope as ECLA classification G06F11/14A2.

**E11.115 Checkpointing the instruction stream (EPO):**  
This subclass is indented under subclass E11.114. This subclass is substantially the same in scope as ECLA classification G06F11/14A2C.

**E11.116 For bus or memory accesses (EPO):**  
This subclass is indented under subclass E11.114. This subclass is substantially the same in scope as ECLA classification G06F11/14A2M.

**E11.117 Of application data (EPO):**  
This subclass is indented under subclass E11.113. This subclass is substantially the same in scope as ECLA classification G06F11/14A4.

**E11.118 Backing up, restoring or mirroring files or drives (EPO):**  
This subclass is indented under subclass E11.117. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B.

**E11.119 Backing up, i.e., point-in-time backup (EPO):**  
This subclass is indented under subclass E11.118. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1.

**E11.12 Hardware arrangements for backup (EPO):**  
This subclass is indented under subclass E11.119. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1H.

**E11.121 Backup Management techniques (EPO):**  
This subclass is indented under subclass E11.119. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1M.
D. CHANGES TO THE DEFINITIONS

E11.122 Recovery techniques (EPO):
This subclass is indented under subclass E11.121. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1M10.

E11.123 Selection of contents (EPO):
This subclass is indented under subclass E11.121. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1M2.

E11.124 Scheduling policy (EPO):
This subclass is indented under subclass E11.121. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1M4.

E11.125 For networked environments (EPO):
This subclass is indented under subclass E11.121. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1M6.

E11.126 Nondisruptive backup (EPO):
This subclass is indented under subclass E11.121. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B1M8.

E11.127 Mirroring (EPO):
This subclass is indented under subclass E11.118. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B3.

E11.128 Distributed database systems; Replica control (EPO):
This subclass is indented under subclass E11.118. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B5.

E11.129 Synchronization between mobile agents and networked agents (EPO):
This subclass is indented under subclass E11.128. This subclass is substantially the same in scope as ECLA classification G06F11/14A4B5M.

E11.13 Using logs or checkpoints (EPO):
This subclass is indented under subclass E11.117. This subclass is substantially the same in scope as ECLA classification G06F11/14A4C.

E11.131 In transactions (EPO):
This subclass is indented under subclass E11.117. This subclass is substantially the same in scope as ECLA classification G06F11/14A4T.
D. CHANGES TO THE DEFINITIONS

E11.132 At operating system level (EPO):
This subclass is indented under subclass E11.113. This subclass is substantially the same in scope as ECLA classification G06F11/14AB.

E11.133 Boot up procedures (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8B.

E11.134 Reconfiguring to eliminate the error (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8C.

E11.135 During software upgrading (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8E.

E11.136 At file system or disk access level (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8F.

E11.137 Restarting or rejuvenating (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8L.

E11.138 Resetting or repowering (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8P.

E11.139 Cleaning up resources (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8R.

E11.14 Suspending and resuming a running system (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8S.

E11.141 Transmit or communication errors (EPO):
This subclass is indented under subclass E11.132. This subclass is substantially the same in scope as ECLA classification G06F11/14A8T.

E11.142 Error detection (EPO):
This subclass is indented under subclass E11.112. This subclass is substantially the same in scope as ECLA classification G06F11/14B.
D. CHANGES TO THE DEFINITIONS

E11.143 By time redundancy (EPO):
This subclass is indented under subclass E11.142. This subclass is substantially the same in scope as ECLA classification G06F11/14B2.

E11.144 Error avoidance, e.g., error spreading countermeasures, fault avoidance, etc. (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/00H.

E11.145 Detection or location of defective computer hardware by testing during standby operation or during idle time, e.g., start-up testing, etc. (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/22.

E11.146 Verification or detection of system hardware configuration (EPO):
This subclass is indented under subclass E11.145. This subclass is substantially the same in scope as ECLA classification G06F11/22C.

E11.147 Logging of test results (EPO):
This subclass is indented under subclass E11.145. This subclass is substantially the same in scope as ECLA classification G06F11/22L.

E11.148 Test methods (EPO):
This subclass is indented under subclass E11.145. This subclass is substantially the same in scope as ECLA classification G06F11/22M.

E11.149 Power-On Test, e.g., POST, etc. (EPO):
This subclass is indented under subclass E11.148. This subclass is substantially the same in scope as ECLA classification G06F11/22M1.

E11.15 Configuration test (EPO):
This subclass is indented under subclass E11.149. This subclass is substantially the same in scope as ECLA classification G06F11/22M1C.

E11.151 Background testing (EPO):
This subclass is indented under subclass E11.148. This subclass is substantially the same in scope as ECLA classification G06F11/22M2.

E11.152 Periodic testing (EPO):
This subclass is indented under subclass E11.148. This subclass is substantially the same in scope as ECLA classification G06F11/22M3.
D. CHANGES TO THE DEFINITIONS

E11.153 Test trigger logic (EPO):
This subclass is indented under subclass E11.148. This subclass is substantially the same in scope as ECLA classification G06F11/22M4.

E11.154 Marginal checking (EPO):
This subclass is indented under subclass E11.145. This subclass is substantially the same in scope as ECLA classification G06F11/24.

E11.155 Testing of logic operation, e.g., by logic analyzers, etc. (EPO):
This subclass is indented under subclass E11.145. This subclass is substantially the same in scope as ECLA classification G06F11/25.

E11.156 Using Fault Dictionaries (EPO):
This subclass is indented under subclass E11.155. This subclass is substantially the same in scope as ECLA classification G06F11/25D.

This subclass is indented under subclass E11.155. This subclass is substantially the same in scope as ECLA classification G06F11/25E.

E11.158 Using Neural Networks (EPO):
This subclass is indented under subclass E11.155. This subclass is substantially the same in scope as ECLA classification G06F11/25N.

E11.159 Functional testing (EPO):
This subclass is indented under subclass E11.145. This subclass is substantially the same in scope as ECLA classification G06F11/26.

E11.16 Reconfiguring circuits for testing, e.g., LSSD, partitioning, etc. (EPO):
This subclass is indented under subclass E11.159. This subclass is substantially the same in scope as ECLA classification G06F11/267.

E11.161 Test of buses, lines or interfaces, e.g., stuck-at or open line faults etc. (EPO):
This subclass is indented under subclass E11.16. This subclass is substantially the same in scope as ECLA classification G06F11/267B.

E11.162 Test or error correction or detection circuits (EPO):
This subclass is indented under subclass E11.16. This subclass is substantially the same in scope as ECLA classification G06F11/267C.
D. CHANGES TO THE DEFINITIONS

E11.163 Test of input/output devices or peripheral units (EPO):
This subclass is indented under subclass E11.16. This subclass is substantially the same in scope as ECLA classification G06F11/267D.

E11.164 Test of ALU (EPO):
This subclass is indented under subclass E11.16. This subclass is substantially the same in scope as ECLA classification G06F11/267H.

E11.165 Test of interrupt circuits (EPO):
This subclass is indented under subclass E11.16. This subclass is substantially the same in scope as ECLA classification G06F11/267N.

E11.166 Test of CPU or processors (EPO):
This subclass is indented under subclass E11.16. This subclass is substantially the same in scope as ECLA classification G06F11/267P.

E11.167 By simulating additional hardware, e.g., fault simulation, etc. (EPO):
This subclass is indented under subclass E11.159. This subclass is substantially the same in scope as ECLA classification G06F11/26S.

E11.168 Emulators (EPO):
This subclass is indented under subclass E11.167. This subclass is substantially the same in scope as ECLA classification G06F11/26S2.

E11.169 Built-in tests (EPO):
This subclass is indented under subclass E11.159. This subclass is substantially the same in scope as ECLA classification G06F11/27.

E11.17 Tester hardware, i.e., output processing circuits (EPO):
This subclass is indented under subclass E11.159. This subclass is substantially the same in scope as ECLA classification G06F11/273.

E11.171 Test interface between tester and unit under test (EPO):
This subclass is indented under subclass E11.17. This subclass is substantially the same in scope as ECLA classification G06F11/273E.

E11.172 Using a storage for the test inputs, e.g., test-ROM, script files, etc. (EPO):
This subclass is indented under subclass E11.17. This subclass is substantially the same in scope as ECLA classification G06F11/273M.
D. CHANGES TO THE DEFINITIONS

E11.173 Remote test (EPO):
This subclass is indented under subclass E11.17. This subclass is substantially the same in scope as ECLA classification G06F11/273R.

E11.174 Using a dedicated service processor for test (EPO):
This subclass is indented under subclass E11.17. This subclass is substantially the same in scope as ECLA classification G06F11/273S.

E11.175 With comparison between actual response and known fault-free response, e.g., signature analyzer, etc. (EPO):
This subclass is indented under subclass E11.17. This subclass is substantially the same in scope as ECLA classification G06F11/277.

E11.176 In Multi-processor systems, e.g., one processor becoming the test master, etc. (EPO):
This subclass is indented under subclass E11.17. This subclass is substantially the same in scope as ECLA classification G06F11/27M.

E11.177 Generation of test inputs, e.g., test vectors, patterns or sequences, etc. (EPO):
This subclass is indented under subclass E11.159. This subclass is substantially the same in scope as ECLA classification G06F11/263.

E11.178 By checking the correct order of processing (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/28.

E11.179 Monitoring (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/30.

E11.18 With visual or acoustical indication of the functioning of the machine (EPO):
This subclass is indented under subclass E11.179. This subclass is substantially the same in scope as ECLA classification G06F11/32.

E11.181 Visualization of programs or trace data (EPO):
This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32P.

E11.182 Display for diagnostics, e.g., diagnostic result display, self-test user interface, etc. (EPO):
D. CHANGES TO THE DEFINITIONS

This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32D.

**E11.183 Display of waveforms, e.g., of logic analyzers, etc. (EPO):**
This subclass is indented under subclass E11.182. This subclass is substantially the same in scope as ECLA classification G06F11/32D4.

**E11.184 Display of status information (EPO):**
This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32S.

**E11.185 By lamps or LED's (EPO):**
This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32S2.

**E11.186 For error or online/offline status (EPO):**
This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32S2E.

**E11.187 Alarm or error message display (EPO):**
This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32S4.

**E11.188 Computer systems status display (EPO):**
This subclass is indented under subclass E11.18. This subclass is substantially the same in scope as ECLA classification G06F11/32S6.

**E11.189 Recording or statistical evaluation of computer activity, e.g., of down time, of input/output operation, etc. (EPO):**
This subclass is indented under subclass E11.179. This subclass is substantially the same in scope as ECLA classification G06F11/34.

**E11.19 Of interconnections, e.g., interconnecting networks, etc. (EPO):**
This subclass is indented under subclass E11.189. This subclass is substantially the same in scope as ECLA classification G06F11/34A.

**E11.191 Of parallel or distributed programming (EPO):**
This subclass is indented under subclass E11.189. This subclass is substantially the same in scope as ECLA classification G06F11/34B.

**E11.192 Performance measurement (EPO):**
This subclass is indented under subclass E11.189. This subclass is substantially the same in scope as ECLA classification G06F11/34C.
D. CHANGES TO THE DEFINITIONS

E11.193 Workload generation, e.g., scripts, playback, etc. (EPO):
This subclass is indented under subclass E11.192. This subclass is substantially the same in scope as ECLA classification G06F11/34C2.

E11.194 Benchmarking (EPO):
This subclass is indented under subclass E11.193. This subclass is substantially the same in scope as ECLA classification G06F11/34C2B.

E11.195 Time measurement, e.g., response time (EPO):
This subclass is indented under subclass E11.192. This subclass is substantially the same in scope as ECLA classification G06F11/34C4.

E11.196 Of active or idle time (EPO):
This subclass is indented under subclass E11.195. This subclass is substantially the same in scope as ECLA classification G06F11/34C4A.

E11.197 Performance evaluation by modeling or statistical analysis (EPO):
This subclass is indented under subclass E11.189. This subclass is substantially the same in scope as ECLA classification G06F11/34M.

E11.198 Performance evaluation by simulation (EPO):
This subclass is indented under subclass E11.189. This subclass is substantially the same in scope as ECLA classification G06F11/34S.

E11.199 Trace driven simulation (EPO):
This subclass is indented under subclass E11.198. This subclass is substantially the same in scope as ECLA classification G06F11/34S2.

E11.2 Performance evaluation by tracing or monitoring (EPO):
This subclass is indented under subclass E11.189. This subclass is substantially the same in scope as ECLA classification G06F11/34T.

E11.201 For interfaces, buses (EPO):
This subclass is indented under subclass E11.2. This subclass is substantially the same in scope as ECLA classification G06F11/34T10.

E11.202 For systems (EPO):
This subclass is indented under subclass E11.2. This subclass is substantially the same in scope as ECLA classification G06F11/34T12.

E11.203 Address tracing (EPO):
D. CHANGES TO THE DEFINITIONS

This subclass is indented under subclass E11.2. This subclass is substantially the same in scope as ECLA classification G06F11/34T2.

E11.204 Data logging (EPO):
This subclass is indented under subclass E11.2. This subclass is substantially the same in scope as ECLA classification G06F11/34T4.

E11.205 Circuit details, i.e., tracer hardware (EPO):
This subclass is indented under subclass E11.2. This subclass is substantially the same in scope as ECLA classification G06F11/34T6.

E11.206 For I/O devices (EPO):
This subclass is indented under subclass E11.2. This subclass is substantially the same in scope as ECLA classification G06F11/34T8.

E11.207 Preventing errors by testing or debugging software (EPO):
This subclass is indented under subclass E11.001. This subclass is substantially the same in scope as ECLA classification G06F11/36.

E11.208 Software debugging (EPO):
This subclass is indented under subclass E11.207. This subclass is substantially the same in scope as ECLA classification G06F11/36D.

E11.209 Compilers or other tools operating on the source text (EPO):
This subclass is indented under subclass E11.208. This subclass is substantially the same in scope as ECLA classification G06F11/36D2.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.2, for instrumentation for performance monitoring.

E11.21 Debuggers (EPO):
This subclass is indented under subclass E11.208. This subclass is substantially the same in scope as ECLA classification G06F11/36D3.

E11.211 Error checking code in the program under test (EPO):
This subclass is indented under subclass E11.208. This subclass is substantially the same in scope as ECLA classification G06F11/36D4.

E11.212 Tracing methods or tools (EPO):
This subclass is indented under subclass E11.208. This subclass is substantially the same in scope as ECLA classification G06F11/36D5.
D. CHANGES TO THE DEFINITIONS

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.2, for performance monitoring.

**E11.213 By using additional hardware (EPO):**
This subclass is indented under subclass E11.208. This subclass is substantially the same in scope as ECLA classification G06F11/36D6.

**E11.214 By making modifications to the CPU (EPO):**
This subclass is indented under subclass E11.213. This subclass is substantially the same in scope as ECLA classification G06F11/36D6C.

**E11.215 By monitoring the bus (EPO):**
This subclass is indented under subclass E11.213. This subclass is substantially the same in scope as ECLA classification G06F11/36D6M.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.2, for performance monitoring.

**E11.216 By emulating the CPU (EPO):**
This subclass is indented under subclass E11.213. This subclass is substantially the same in scope as ECLA classification G06F11/36D6E.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.168, for testing hardware.

**E11.217 User interfaces for testing or debugging software (EPO):**
This subclass is indented under subclass E11.207. This subclass is substantially the same in scope as ECLA classification G06F11/36G.

SEE OR SEARCH THIS CLASS, SUBCLASS:
E11.18, for hardware monitoring.

**E11.218 Methods or tools for writing reliable software and for evaluating software (EPO):**
This subclass is indented under subclass E11.207. This subclass is substantially the same in scope as ECLA classification G06F11/36M.
D. CHANGES TO THE DEFINITIONS

SEE OR SEARCH THIS CLASS, SUBCLASS:

E11.008, for fault-tolerant software.

**E11.219 Methods or tools to render software testable (EPO):**
This subclass is indented under subclass E11.218. This subclass is substantially the same in scope as ECLA classification G06F11/36M2.

**E11.22 Software metrics (EPO):**
This subclass is indented under subclass E11.218. This subclass is substantially the same in scope as ECLA classification G06F11/36M3.