

1990 No. 1588

CUSTOMS AND EXCISE

**The Export of Goods (Control) (Amendment No. 4)
Order 1990**

Made - - - - *1st August 1990*
Coming into force *11th August 1990*

The Secretary of State, in exercise of powers conferred by section 1 of the Import, Export and Customs Powers (Defence) Act 1939(a) and now vested in him(b), and of all other powers enabling him in that behalf, hereby makes the following Order:

1. This Order may be cited as the Export of Goods (Control) (Amendment No. 4) Order 1990 and shall come into force on 11th August 1990.

2. The Export of Goods (Control) Order 1989(c) shall be further amended as follows:

(a) in article 1(2), for the definition of ODMA software there shall be substituted:

“ODMA software” means operating systems, diagnostic systems, maintenance systems or application software; and in each case includes only the minimum software necessary to enable the equipment to perform the function for which it was designed; and “operating systems”, “diagnostic systems”, “maintenance systems” and “application software” shall have the meanings respectively assigned to them in entry IL1566 in Group 3G in Part II of Schedule 1 hereto for the purposes of that entry;”;

(b) in article 2, in paragraphs (xi) and (xii) the words “or Namibia” shall be deleted;

(c) in Group A of Part I of Schedule 1 (Goods specified by reference to headings and subheadings of the Combined Nomenclature (“CN”)), there shall be deleted the entry relating to the following CN heading: ex 7118 (coins of silver alloy of the United Kingdom minted before 1947, but not more than 100 years old at the date of exportation, exported in a quantity exceeding 10 in number);

(d) the entries in Part II of Schedule 1 to the Order specified in the Schedule hereto shall be deleted;

(e) in Group 3A of Part II of Schedule 1-

(i) for entry IL1091 there shall be substituted the following entry:

“IL1091 Numerical control units, numerically controlled machine tools, components, specially designed parts and sub-assemblies, software and technology, the following -

(a) Numerical control units for machine tools, having any of the following characteristics, and specially designed ODMA software and specially designed components therefor -

(1) more than three interpolating axes can be coordinated simultaneously for contouring controlW

(2) two or three interpolating axes can be coordinated simultaneously for contouring control and

- (A) the smallest programmable increment, namely the input resolution, for any linear axis is less than 0.001 mmW

NOTE: In case of units with only two linear axes one of them may have a smallest programmable increment of less than 0.001 mm but not less than 0.0005 mm.

- (B) interpolation of third order or higher is possible (e.g. spline or involute interpolation)..... W
- (C) word size of more than 32 bit (excluding parity bits)W
- (D) capable of real-time processing of data to modify, during the machining operation, tool path, feed rate and spindle data by either -
 - (a) automatic calculation and modification of part programme data for machining in two or more axes by means of measuring cycles and access to source data W
 - or
 - (b) adaptive control with more than one physical variable measured and processing by means of a computing model (strategy) to change one or more machining instructions to optimize the process...W
- (E) capable of receiving directly (on-line) and processing computer aided design (CAD) data for internal preparation of machine instructionsW

except-

numerical control units which are either:

- (a) modified for and incorporated in machines not specified in this Schedule; or
 - (b) specially designed for machines not specified in this Schedule;
- (b) Machine tools, for removing, cutting or spark eroding metals, ceramics or composites, the following -
- (1) machine tools for turning which have all the following characteristics W
 - (A) according to the manufacturer's technical specifications, can be equipped with numerical control units specified in head (a) above, even when not equipped with such units at delivery;
 - (B) have two or more axes which can be coordinated simultaneously for controlling control
 - (C) have any of the following:
 - (a) two or more contouring rotary axes;
 - (b) run out (out-of-true running) less (better) than 0.0008 mm total indicator reading (TIR);
 - (c) camming (axial displacement) less (better) than 0.0008 mm total indicator reading (TIR); or
 - (d) the positioning accuracies, with all compensations available, are better than -
 - (1) overall positioning along any linear axis of -
 - (A) 0.006 mm for a total length of axis travel L equal to or shorter than 500 mm; or
 - (B) $(0.006 + 0.001 \times (L - 500)/500)$ mm if L is longer than 500 mm and shorter than 5,500 mm; or

- (C)0.016 mm if L is equal to or longer than 5,500 mm; or
- (2) of any rotary axis, 0.001°;
- (2) machine tools for milling which have all the following characteristicsW
 - (A) according to the manufacturer's technical specifications, can be equipped with numerical control units specified in head (a) above, even when not equipped with such units at delivery;
 - (B) have two or more axes which can be coordinated simultaneously for contouring control;
 - (C) have any of the following:
 - (a) two or more contouring rotary axes;
 - (b) one or more contouring tilting spindles;
 - (c) run out (out-of-true running) less (better) than $2 \times D \times 10^{-5}$ mm total indicator reading (TIR) where D equals the diameter of the spindle in mm;
 - (d) the positioning accuracies, with all compensations available, are better than -
 - (1) overall positioning along any linear axis of -
 - (A)0.006 mm, if none of the axes exceeds a total length of axis travel L of 650mm;
 - (B)if the total length of axis travel L of any axis is longer than 650 mm, 0.008 mm or $(0.008 + 0.0015 \times (L - 500)/500)$ mm whichever is higher, for axes up to 5,500 mm of travel; or
 - (C)0.023 mm for any axis the total length L of which is equal to or longer than 5,500 mm;
 - or
 - (2) of any rotary axis, 0.001°; or
 - (e) a motor power of any spindle of more than 75 kW;
- (3) Machine tools for grinding which have all the following characteristicsW
 - (A) according to the manufacturer's technical specifications, can be equipped with numerical control units specified in head (a) above, even when not equipped with such units at delivery;
 - (B) have two or more axes which can be coordinated simultaneously for contouring control;
 - (C) have any of the following-
 - (a) two or more contouring rotary axes;
 - (b) one or more contouring tilting spindles;
 - (c) run out (out-of-true running) less (better) than 0.0008 mm total indicator reading (TIR); or
 - (d) the positioning accuracies, with all compensations available, are better than -
 - (1) overall positioning along any linear axis of -
 - (A)0.004 mm, for a total length of axis travel L equal to or shorter than 300 mm;
 - (B) $(0.004 + 0.001 \times (L - 300)/300)$ mm if L is longer than 300 mm, and shorter than 3,300 mm; or
 - (C)0.014 mm if L is equal to or longer than 3,300 mm; or

(2) of any rotary axis, 0.001°;

except-

tool or cutter grinding machines having all the following characteristics -

- (a) no more than four axes can be coordinated simultaneously for contouring control;
 - (b) no more than two rotary axes can be coordinated simultaneously for contouring control;
 - (c) run out (out-of-true running) more (worse) than 0.0008 mm total indicator reading (TIR);
 - (d) the positioning accuracies, with all compensations available, are not better than:
 - (1) overall positioning along any linear axis of 0.004 mm; or
 - (2) of any rotary axis, 0.001°; and
 - (e) a maximum slide travel along any axis of less than 200 mm;
- (4) electrical discharge machines (EDM) of the wire feed type which have five or more contouring axes and which can be equipped with one of the following -
- (A) numerical control units specified in head (a) above even when not equipped with such units at deliveryW
 - (B) electronic controllers specified in head (b) in entry IL1391 in Group 3D.....W
- (5) electrical discharge machines (EDM) of the non-wire type which have two or more contouring rotary axes and which can be equipped with one of the following -
- (A) numerical control units specified in head (a) above even when not equipped with such units at deliveryW
 - (B) electronic controllers specified in head (b) in entry IL1391 in Group 3D.....W
- (6) machine tools for removing metals ceramics or composites, having all the following characteristics.W
- (A) acting by means of -
 - (a) water or other liquid jets, whether or not employing abrasive additives
 - (b) electron beam; or
 - (c) laser beam; and
 - (B) according to the manufacturer's technical specifications, can be equipped with numerical control units specified in head (a) above, even when they are not equipped with such units at delivery; and
 - (C) having two or more rotary axes which -
 - (a) can be coordinated simultaneously for contouring control; and
 - (b) have a positioning accuracy of better than 0.01°;
- (c) Technology for -
- (1) the development of numerical control units for machine toolsD
 - (2) the production of numerical control units which have either of the following characteristics:
 - (A) specified in head (a) aboveD
 - (B) containing a microprocessor with both of the followingD

- (a) a word length of 32 bit; and
- (b) a bus architecture of 32 bit;
- (3) the development of numerically controlled machine tools for removing, cutting or spark eroding metals, ceramics or composites.....D
- (4) the production of numerically controlled machine tools which have either of the following characteristics -
 - (A) specified in head (b) aboveD
 - (B) a positioning accuracy along any linear axis of better than 0.02 mm.....D
- (5) the development of components specified in head (d) or (e) belowD
- (6) the production of components or sub-assemblies, which have either of the following characteristics -
 - (A) specified in head (d) or sub-head (e)(2) belowD
 - (B) not specified in sub-head (d)(2) or (d)(3) belowD
- (7) the development of interactive graphics as an integrated part in numerical control units for preparation or modification of part programmesD
- (8) the development of generators of machine tool instructions (eg part programmes) from design data residing inside numerical control unitsD
- (9) the incorporation of expert systems for advanced decision support of shop floor operations.....D
- (10) the development of flexible manufacturing units used with the software specified in sub-head (b)(5)(E) in entry IL1566 in Group 3GD
- (d) Components and specially designed parts for machine tools specified in head (b) above, the following-
 - (1) spindle assemblies, consisting of spindles and bearings as a minimal assembly, with run-out (out-of-true running) less than -
 - (A) 0.0008 mm total indicator reading (TIR) for machine tools for turning or grinding.....W
 - (B) $2 \times D \times 10^{-5}$ mm total indicator reading (TIR), where D equals the diameter of the spindle in mm, for machine tools for milling.....W
 - (2) linear position feedback units (eg inductive type devices, graduated scales, laser or infrared systems) having, with compensation, an overall accuracy better than $\pm (0.0015 + L \times 10^{-6})$ mm, where L equals the effective length in mm of the linear measurementW
 - (3) rotary position feedback units (eg inductive type devices, graduated scales, laser or infrared systems) having, with compensation, an accuracy better than $\pm 0.00025^\circ$ W
 - (4) slide way assemblies consisting of a minimal assembly of ways, bed and slide with all of the following characteristics.....W
 - (A) a yaw, pitch or roll of less than 2 seconds of arc, total indicator reading (TIR);
 - (B) a horizontal straightness of less than 0.004 mm;
 - and
 - (C) a vertical straightness of less than 0.004 mm;
 - (5) ball screws, having all of the following characteristics ...W

- (A) a sum of tolerance of mean travel deviation (e) and half the travel variation (Vu) less than $(0.0025 + 5 \times 10^{-6} \times L)$ mm, where L is the useful travel in mm of the ball screw;
 - (B) a tolerance of travel variation (V300) within 300 mm travel of the ball screw less than 0.004 mm; and
 - (C) a run-out (out-of-true running) of the journal diameter related to the screw shaft outer diameter less than 0.005 mm total indicator reading (TIR), at an axial distance of 3 or more times the screw shaft outer diameter from the end of the journal;
- (6) single point diamond cutting tool inserts having all of the following characteristicsW
- (A) a flawless and chip-free cutting edge when magnified 400 times in any direction;
 - (B) a cutting radius out-of-roundness less than 0.002 mm total indicator reading (TIR); and
 - (C) a cutting radius between 0.1 and 5.0 mm;
- (7) linear induction motors used as drives for slides having all the following characteristicsW
- (A) a stroke longer than 200 mm for linear slides;
 - (B) a nominal force rating above 45 N; and
 - (C) a minimal controlled incremental movement less than 0.001 mm for linear motion;
- (e) Specially designed components or sub-assemblies, capable of upgrading, according to the manufacturer's specifications, numerical control units, machine tools or feed-back devices to or above the levels specified in head (a) or (b), or in sub-head (d)(2) or (d)(3) above, the following -
- (1) printed circuit boards with mounted components and software thereforW
 - (2) compound rotary tablesW

In this entry -

“accuracy”, usually measured in terms of inaccuracy, means the maximum deviation, positive or negative, of an indicated value from an accepted standard or true value;

“adaptive control” means a control system that adjusts the response from conditions detected during the operation;

“camming” (axial displacement) means axial displacement in one revolution of the main spindle measured in a plane perpendicular to the spindle faceplate, at a point next to the circumference of the spindle faceplate;

“compound rotary table” means a table allowing the workpiece to rotate and tilt about two non-parallel axes, which can be coordinated simultaneously for contouring control;

“contouring control” means two or more numerically controlled motions operating in accordance with instructions that specify the next required position and the required feed rates to that position. These feed rates are varied in relation to each other so that a desired contour is generated;

“numerical control” means the automatic control of a process performed by a device that makes use of numeric data usually introduced as the operation is in progress;

“positioning accuracy” of numerically controlled machine tools is to be determined and presented in accordance with ISO/DIS 230/2, paragraph 2.13, in conjunction with the requirements below:

(a) test conditions:-

- (1) for 12 hours before and during measurements, the machine tools and accuracy measuring equipment will be kept at the same ambient temperature. During the premeasurement time the slides of the machine will be continuously cycled in the same manner that the accuracy measurements will be taken;
- (2) the machine shall be equipped with any mechanical, electronic, or software compensation to be exported with the machine;
- (3) accuracy of measuring equipment for the measurements shall be at least 4 times more accurate than the expected machine tool accuracy;
- (4) power supply for slide drives shall be the following:-
 - (A) line voltage variation shall not be greater than ± 10 percent of nominal rated voltage;
 - (B) frequency variation shall not be greater than ± 2 Hz of normal frequency;
 - (C) lineouts or interrupted service are not permitted.

(b) test programme:-

- (1) feed rate (velocity of slides) during measurement shall be the rapid traverse rate;
NOTE: In case of machine tools which generate optical quality surfaces, the feed rate shall be equal to or less than 50 mm per minute;
- (2) measurements shall be made in an incremental manner from one limit of the axis travel to the other without returning to the starting position for each move to the target position;
- (3) axes not being measured shall be retained at mid travel during test of an axis.

(c) presentation of test results:-

the results of the measurements must include:-

- (1) positioning accuracy (A); and
- (2) the mean reversal error (B).

“run out” (out-of-true running) means radial displacement in one revolution of the main spindle measured in a plane perpendicular to the spindle axis at a point on the external or internal revolving surface to be tested;

“tilting spindle” means a tool holding spindle which alters, during the machining process, the angular position of its centre line with respect to any other axis;

“machine tools for removing, cutting or spark eroding metal, ceramics or composites” are the following:

(a) machine tools for turning, including -

- (1) horizontal turning machines;
- (2) vertical turning machines;
- (3) turning centres, with or without milling or grinding options;
- (4) machines for generating optical quality surfaces;

(b) machine tools for milling, including -

- (1) boring machines;
- (2) boring-milling machines;
- (3) milling machines;
- (4) machining centres, with or without turning or grinding options;
- (5) machine tools for routing;
- (c) machine tools for grinding, with or without milling or turning options, including -
 - (1) jig grinding machines;
 - (2) contour grinding machines;
 - (3) tool and cutter grinding machines;
- (d) machine tools using electric discharge for machining;
- (e) other machine tools, as follows:
 - (1) water and other liquid jet machines;
 - (2) electron beam cutting machines; or
 - (3) laser cutting machines.

Any term used in this entry shall bear the meaning it has in entry IL1565 and entry IL1566 in Group 3G.”;

(ii) after entry PL7005 there shall be inserted the following new entry:

“IL1099 Dimensional inspection systems or devices, the following: and specially designed components and specially designed ODMA software therefor -

- (a) Manual dimensional inspection machines with two or more axes, and having a measurement uncertainty equal to or less (better) than $(0.25 + L/1000)$ micrometre in any axis (L is measured length in mm).....C
except optical comparators
- (b) Computer controlled or numerically controlled dimensional inspection machines having both of the following characteristicsC
 - (1) two or more axes;
 - (2) a one dimensional (1D) length measurement uncertainty equal to or less (better) than $(1.5 + L/1000)$ micrometre tested with a probe of an accuracy of less (better) than 0.2 micrometre (L is measured length in mm);
- (c) Linear angular displacement measuring devices, the following-
 - (1) linear measuring instruments having any of the following characteristics -
 - (A) non-contact type measuring systems with a resolution equal to or less than 0.2 micrometre within a measuring range up to 0.2mm.....C
 - (B) linear voltage differential transformer systems having both of the following characteristics.....C
 - (a) linearity equal to or less (better) than 0.1% within a measuring range up to and including 5 mm; and
 - (b) drift equal to or less (better) than 0.1% per day at a standard ambient test room temperature ± 1 K; or
 - (C) measuring systems having both the following characteristicsC
 - (a) contain a laser;
 - (b) maintain for at least 12 hours, over a temperature range of ± 1 K around a standard temperature and at a standard pressure -

- (1) a resolution over their full scale of ± 0.1 micrometre or better; and
- (2) a measurement uncertainty equal to or less (better) than $(0.2 + L/2000)$ micrometre. (L is measured length in mm);
- (2) angular measuring instruments having an angular position deviation equal to or less (better) than 0.00025° C
except
optical instruments, such as autocollimators, using collimated light to detect angular displacement of a mirror;
- (d) Systems for simultaneous linear-angular inspection of hemispheres, having both of the following characteristics.....C
 - (1) measurement uncertainty along any linear axis equal to or less (better) than 3.5 micrometre per 5 mm;
 - (2) angular position deviation equal to or less (better) than 0.02° ;

NOTE: Specially designed ODMA software for the systems described in this head includes software for simultaneous measurement of wall thickness and contour.

In this entry -

“angular position deviation” means the maximum difference between angular position and the actual, very accurately measured angular position, after the workpiece mount of the table has been turned out of its initial position;

“linearity” (usually measured in terms of non-linearity) means the maximum deviation of the actual characteristic (average of upscale and downscale readings), positive or negative, from a straight line so positioned as to equalise and minimise the maximum deviations;

“measurement uncertainty” means the characteristic parameter which specifies in what range about the output value the correct value of the measurable variable lies with a confidence level of 95%. It includes the uncorrected systematic deviations, the uncorrected backlash and the random deviations;

“resolution” means the least increment of a measuring device; on digital instruments, the least significant bit.”;

(f) in Group 3D of Part II of Schedule 1-

(i) for entry IL1353 there shall be substituted the following entry:

“IL1353 Manufacturing and testing equipment for optical fibre, optical cable and other cables, the following: and specially designed components and specially designed ODMA software therefor -

- (a) Equipment specially designed to manufacture cable specified in head (a) or (d) of entry IL1526 in Group 3F.....C
- (b) Equipment specially designed to manufacture optical fibre specified in entry IL1526 in Group 3FC
- (c) Equipment specially designed to manufacture optical fibre preforms specified in entry IL1767 in Group 3IC
- (d) Optical fibre and optical fibre preform characterisation equipment using semiconductor lasers for the testing of optical fibres or optical fibre preforms at operating wavelengths exceeding 1,000 nmC”;

(ii) for entry IL1370 there shall be substituted the following entry:

“IL1370 Machine tools for generating optical quality surfaces, specially designed components and accessories therefor, the following: and specially designed ODMA software therefor -

- (a) Turning machines using a single point cutting tool and having all of the following characteristics.....C
 - (1) slide positioning accuracy less (better) than 0.0005 mm per 300 mm of travel total indicator reading (TIR);
 - (2) slide positioning repeatability less (better) than 0.00025 mm per 300 mm of travel total indicator reading (TIR);
 - (3) spindle runout (radial and axial) less than 0.0004 mm total indicator reading (TIR);
 - (4) angular deviation of the slide movement (yaw, pitch and roll) less (better) than 2 seconds of arc total indicator reading (TIR) over full travel;
 - (5) slide perpendicularity less than 0.001 mm per 300 mm of travel total indicator reading (TIR);
- (b) Fly cutting machines having both of the following characteristicsC
 - (1) spindle run-out (radial and axial) less than 0.0004 mm total indicator reading (TIR);
 - (2) angular deviation of slide movement (yaw, pitch and roll) less (better) than 2 seconds of arc total indicator reading (TIR) over full travel;
- (c) Specially designed components, the following -
 - (1) spindle assemblies, consisting of spindles and bearings as a minimal assemblyC
except
those assemblies with axial and radial axis motion measured along the spindle axis in one revolution of the spindle equal to or greater (worse) than 0.0008 mm total indicator reading (TIR);
 - (2) linear induction motors used as drives for slides, having all the following characteristicsC
 - (A) stroke longer than 200 mm;
 - (B) nominal force rating greater than 45 N;
 - (C) minimum controlled incremental movement less than 0.001 mm;
- (d) Specially designed accessories, namely single point diamond cutting tool inserts having all the following characteristicsC
 - (1) flawless and chip-free cutting edge when magnified 400 times in any direction;
 - (2) cutting radius between 0.1 and 5 mm;
 - (3) cutting radius out-of-roundness less than 0.002 mm total indicator reading (TIR).”;

(iii) for entry IL1391 there shall be substituted the following entry:

“IL1391 Robots, robot controllers and robot end-effectors, the following: and specially designed components and specially designed ODMA software therefor -

- (a) Robots having any of the following characteristics -
 - (1) capable of employing feedback information in real-time processing from vision systems to generate or modify programmes or to generate or modify numerical programme data.....C
except
(A) those capable of processing no more than 100,000 pixels using an industrial television camera, or no more than 65,536 pixels using a solid-state camera;

- (B) those using a single-scene analysis processor having neither a word size of more than 32 bit (excluding parity bits) nor parallel processing for the same task;
- (C) those having software not capable of full three-dimensional mathematical modelling or full three-dimensional scene analysis;

NOTE: The above exception includes approximation of the third dimension by viewing at a given angle, and limited grey scale interpretation for the perception of depth or texture for the approved tasks (2 1/2 D);

- (D) those having no user-accessible programmability other than by input reference images through the system's camera; or
- (E) those capable of no more than one scene analysis every 0.1 second;

The exceptions in paragraphs (a), (b) (c) (d) and (e) above do not apply to technological documents the information in which includes information relating to goods excluded by paragraphs (a) (b) (c) (d) or (e) other than that necessary for the operation, repair or maintenance of the robot.

- (2) specially designed to comply with national safety standards applicable to explosive munitions environments.....C
- (3) incorporating means of protecting hydraulic lines against externally induced punctures caused by ballistic fragments (eg, incorporating self-sealing lines) and designed to use hydraulic fluids with flash points higher than 839 K (566°C).....C
- (4) specially designed for underwater use (namely incorporating special techniques or components for sealing, pressure compensation or corrosion resistance).....C
- (5) operable at altitudes exceeding 30,000 m.....C
- (6) specially designed for outdoor applications and meeting military specifications thereforC
- (7) specially designed or rated for operating in an electro-magnetic pulse (EMP) environment.....C
- (8) specially designed or rated as radiation-hardened beyond that necessary to withstand normal industrial (namely non-nuclear industry) ionising radiationC
- (9) equipped with precision measuring devices specified in entry IL1099 in Group 3AC
- (10) specially designed to move autonomously its entire structure through three-dimensional space in a simultaneously coordinated manner.....C

except

- (A) systems in which the robot moves along a fixed path;
- (B) robots specially designed for household use or those modified from household robots for educational purposes (pre-university), if not specified elsewhere in this entry;

- (b) Electronic controllers or end effectors specially designed for robots specified in head (a) above.....C”;

(g) in Group 3F of Part II of Schedule 1-

(i) for entry IL1516 there shall be substituted the following entry:

“IL1516 Receivers, the following: and specially designed components, accessories and specially designed ODMA software therefor -

- (a) Digitally controlled radio receivers (whether or not computer controlled) which-
 - (1) search or scan automatically a part of the electromagnetic spectrum, and indicate or identify the received signals; and
 - (2) complete the switching operation in less than 4.5msC
 except:
 non-ruggedised, pre-set radio receivers designed for use in civil communications which have 1,000 selective channels or fewer;
 - (b) Receivers for spread spectrum and frequency agile systems, having a total transmitted bandwidth which is-
 - (1) 100 or more times the bandwidth of any one information channel; and
 - (2) in excess of 50 kHz.....C
 - (c) Receivers which incorporate digital signal processing.....C
- except
 receivers which are specially designed for internationally allocated civil frequency bands only and which do not permit user-accessible programmability of the digital signal processing circuits.

In this entry-

“spread spectrum” means the technique whereby energy in a narrow-band communication channel is spread over a much wider energy spectrum under the control of a random or pseudo-random bit stream; on receipt, the signal is correlated with the same bit stream to achieve the reverse process of reducing the bandwidth to its original form; by allocating different bit streams to different subscribers transmitting simultaneously, significantly greater use can be made of available bandwidth; “frequency agility” means a system in which the transmission frequency of a single communication channel is made to change by discrete steps under the control of a similar bit stream (sometimes known as frequency hopping).”;

(ii) for entry IL1519 there shall be substituted the following entry:

“IL1519 Telecommunication transmission equipment, measuring and test equipment, the following: and specially designed components, accessories and specially designed ODMA software therefor -

- (a) Telecommunication transmission equipment employing digital techniques (including the digital processing of analogue signals) and having any of the following characteristics -
 - (1) designed for a total digital transfer rate which, at the highest multiplex level, exceeds -
 - (A) 45 million bit/sC
 - (B) 8.5 million bit/s, in the case of stored programme controlled digital cross-connection equipmentC
 or
 - (C) 90 million bit/s, to take account of line coding and overhead, for:
 - (a) line terminating equipment;
 - (b) intermediate amplifier equipment;
 - (c) repeater equipment;
 - (d) regenerator equipment;
 - (e) translation encoders (transcoders)C
 - (2) designed for a data signalling rate which exceeds -

- (A) 9,600 bit/s, when using the bandwidth of one voice channel.....C
- or
- (B) 64,000 bit/s, when using basebandC
- or
- (3) employing a laser having a transmission wavelength exceeding 1,000 nm.....C
- (b) Telecommunication transmission equipment employing lasers and any of the following techniques -
 - (1) in the case of equipment which has a bandwidth which exceeds 45 MHz or an operating wavelength longer than 1,370 nm, analogue techniques.....C
 - (2) optical heterodyne or homodyne detection techniques (also called coherent optical transmission techniques)C
 - or
 - (3) wavelength division multiplexing techniques.....C
- (c) Electronic measuring or test equipment, including bit error rate test sets, specially designed for equipment designed for the total digital transfer rate specified in sub-head (a)(1) aboveC
- (d) Technology for the development or production of equipment employing digital transmission techniques for operation at a total digital transfer rate at the highest multiplex level exceeding 8.5 million bit/s.....D

There shall be excluded from this entry:

- (a) telemetering, telecommand and telesignalling equipment designed for industrial purposes (being sensing heads for the conversion of information into electrical signals, and the systems used for transmitting these electrical signals long distance and translating them into coded data, into control signals and into display signals);
- (b) facsimile equipment not specified by entry IL1527 in Group 3F;
- (c) equipment employing exclusively the direct current transmission technique.

In this entry:

“data signalling rate” has the same meaning as in entry IL1567 in Group 3G;

“telecommunication transmission equipment” means equipment which is -

- (a) any, or any combination, of the following:
 - (1) line terminating equipment;
 - (2) intermediate amplifier equipment;
 - (3) repeater equipment;
 - (4) regenerator equipment;
 - (5) translation encoders (transcoders);
 - (6) multiplex equipment;
 - (7) modulators or demodulators (modems);
 - (8) transmultiplex equipment; or
 - (9) stored programme controlled digital cross-connection equipment; and
- (b) designed for use in single or multi-channel communication via:
 - (1) wire (line);
 - (2) coaxial cable;

- (3) optical fibre cable; or
- (4) electromagnetic radiation.”;

(iii) for entry IL1520 there shall be substituted the following entry:

“IL1520 Radio relay communication equipment, specially designed test equipment, software and technology, the following: and specially designed components and accessories therefor -

(a) Radio relay communication equipment designed for use at frequencies exceeding 960 MHz.....W

except:

- (1) microwave radio links for fixed civil installations, which -
 - (A) employ analogue transmission; and
 - (B) are designed for operation at fixed frequencies not exceeding 23.6 GHz;

- (2) microwave radio links which -
 - (A) employ digital transmission techniques;
 - (B) are designed for operation at a total digital transfer rate not exceeding 45 Mbit/s or, taking into account line coding and overhead, 90 Mbit/s;
 - (C) if the total digital transfer rate exceeds 8.5 million bit/s, do not employ quadrature-amplitude-modulation (QAM) techniques above level 4; and
 - (D) operate at fixed frequencies not exceeding 23.6 GHz;

- (3) ground communication radio equipment designed for civil use with temporarily fixed services and at fixed frequencies not exceeding 23.6 GHz, with a power output of not more than 5 W;

- (4) civil sound or television broadcast receiving stations for satellite reception, which-
 - (A) are designed to comply with ITU standards;
 - (B) are specially designed for use at fixed frequencies allocated by the International Telecommunications Union (ITU) for civil television or sound radio satellite broadcasting; and

(C) operate at frequencies not exceeding 31 GHz;

- (5) equipment which is-
 - (A) specially designed for the transmission of television signals; and
 - (B) operates at frequencies not exceeding 23.6 GHz;

- (6) equipment which is -
 - (A) specially designed to be installed and operated in satellite earth stations for the following civil uses-
 - (a) communication and direct broadcast;
 - (b) telemetry-tracking-and-command; or
 - (c) weather or meteorological purposes; and
 - (B) designed for an operating frequency not exceeding 31 GHz;

(b) Tropospheric scatter communication equipment.....C
except:

equipment which has all the following characteristics, namely, that it:

- (1) is designed for fixed civil use;
- (2) operates at fixed frequencies of 2.7 GHz or less;

- (3) uses frequency modulation; and
- (4) has a power amplifier output of 10 kW or less;
- (c) Stand-alone radio transmission media simulators or channel estimators and specially designed ODMA software therefor, specially designed for testing equipment specified in head (a) or (b) aboveC
 except:
 equipment in which the adjustments can only be made manually;
- (d) Technology:
 - (1) for equipment employing quadrature-amplitude-modulation (QAM) techniques or otherwise specified in head (a) above.....D
 except:
 technology for equipment employing quadrature-amplitude-modulation techniques, where such technology is for the installation, operation or maintenance of such equipment;
 - (2) for equipment specified in paragraph (6) of the exception to head (a) aboveD
 except:
 technology for the installation, operation or maintenance of such equipment;
 or
 - (3) for equipment excluded from this entry in paragraph (1) or (2) belowD
 except:
 technology for the installation, operation or maintenance of such equipment;

There shall be excluded from this entry -

- (1) equipment for civil television transmission or for general commercial traffic, which -
 - (a) is not designed for operation at a total digital transfer rate exceeding 45 million bit/s;
 - (b) does not employ quadrature-amplitude-modulation (QAM) techniques; and
 - (c) has a maximum operating frequency not exceeding 23.6 GHz;
- (2) analogue microwave transmission equipment for civil industrial use (for example, remote supervision, control and metering of oil and gas pipelines, use in electricity networks and other civil public utility services including use in telephone channels for the operation of electricity networks and in the engineering service circuits required for the maintenance of telecommunication links), provided the maximum operating frequency does not exceed 23.6 GHz.”;

(iv) for entry IL1531 there shall be substituted the following entry:

“IL1531 Frequency synthesisers, and equipment containing such frequency synthesisers, and technology, the following:

- (a) Frequency synthesisers containing frequency standards specified in head (c) in entry IL1529 in Group 3FC
- (b) Instrument frequency synthesisers and synthesised signal generators, and specially designed components and accessories therefor, designed for ground use, and producing output frequencies the accuracy of which and the short term and long

term stability of which are controlled by, derived from, or disciplined by the input frequency or internal master standard frequency, and having any of the following characteristics -

- (1) a maximum synthesised output frequency of more than 550 MHzC
- (2) any of the following noise characteristics -
 - (A) a single sideband (SSB) phase noise better than -120 dBc/Hz when measured at a 20 kHz offset from the carrier frequencyC
 - (B) a single sideband (SSB) phase noise better than -106 dBc/Hz when measured at a 100 Hz offset from the carrier frequencyC
 - (C) an integrated phase noise better than -60 dBc/Hz referred to a 30 kHz band centred on the carrier, excluding the 1 Hz band centred on this carrier.....Cor
 - (D) an integrated AM noise better than -70 dBc/Hz referred to a 30 kHz band centred on the the carrier, excluding the 1Hz band centred on this carrier.....C

except:

synthesised signal generators having the characteristics specified in paragraph (1) or (2)(A) above and a maximum synthesised output frequency of 1,400 MHz or a single sideband phase noise of not less than -136 dBc/Hz when measured at an offset of 20 kHz from a carrier frequency of 100 MHz, provided that the technology supplied is the minimum necessary for the installation, operation and maintenance of the generator;

- (3) electrically programmable in frequency, with a frequency switching time of less than 5ms.....C
 - (4) electrically programmable in phase, with a switching time from one selected phase value to another of less than 10 ms, except where incorporating pre-emphasis networks from frequency modulation.....C
 - (5) a level of spurious components in the output, measured relatively to the selected output frequency, better than -
 - (A) -60 dB harmonic.....Cor
 - (B) -92 dB non-harmonicC
 - (6) more than 3 different selected synthesised output frequencies available simultaneously from one or more outputs.C
 - (7) facilities for pulse modulation of the output frequency...C
- (c) Airborne communication equipment using frequency synthesizers, the following: and specially designed components and accessories therefor -
- (1) equipment designed to receive or transmit frequencies of more than 156 MHz.....C
 - (2) equipment which incorporates facilities for the rapid selection of more than 200 channels per item of equipment...C
except equipment which operates in the frequency range of 108 to 137 MHz, incorporates facilities for the rapid selection of 760 channels or fewer at not less than 25 kHz channel spacing and has been in normal civil use for at least one year;
 - (3) equipment with a frequency switching time of less than 10 msC

- (4) frequency synthesisers designed for the airborne communication equipment specified above (whether supplied therewith or separately), exceeding any of the parameters referred to in head (b) aboveC
- (d) Radio transmitters using frequency synthesis and incorporating transmitter drive units, exciters and master oscillators, the following: and specially designed components and accessories therefor -
 - (1) equipment having an output frequency of more than 550 MHzC
 - except:
 - (A) television broadcasting transmitters having all of the following characteristics -
 - (a) an output frequency not exceeding 960 MHz;
 - (b) a frequency resolution of not better than 1 kHz; and
 - (c) there is incorporated in or driving the transmitter a manually-operated frequency synthesiser which has an output frequency not exceeding 120 MHz;
 - (B) ground communication equipment designed for civil use in the land mobile or marine services (for example cellular radio communications systems, amateur radio or portable radiophone) and having all of the following characteristics -
 - (a) an operating frequency of not more than 1.3 GHz;
 - (b) a power output of 50 W or less for mobile units, or 300 W or less for fixed units;
 - (c) in the case of cellular radio base stations, use of analogue radio transmission only;
 - (d) a transmitter frequency switching time of 4.5 ms or more;
 - (e) a frequency resolution of not better than 2.5 kHz;
 - (f) none of the features specified in head (c) of entry IL1517 in Group 3F;
 - (2) equipment having more than three different selected synthesised output frequencies available simultaneously from one or more outputs.....C
 - (3) equipment with facilities for pulse modulation of the output frequency of the transmitter or of the incorporated frequency synthesiserC
 - (4) frequency synthesisers designed for radio transmitters incorporating transmitter drive units, exciters and master oscillators (whether supplied therewith or separately) exceeding any of the parameters referred to in head (b) aboveC
 - except-
 - those specially designed for radio telephones described in the exception in paragraph (1)(B) above;
- (e) Technology for equipment referred to in paragraph (1)(B) of the exception to head (d) above, where such technology is for the development or production of digital equipment or of specially designed ODMA software for use in digital civil land mobile networksD

There shall be excluded from this entry equipment in which the output frequency is produced by the addition or subtraction of two or more crystal oscillator frequencies, whether or not followed by multiplication of the result.

In this entry -

“frequency synthesiser” means any kind of frequency source or signal generator, regardless of the actual technique used, providing a multiplicity of simultaneous or alternative output frequencies, from one or more outputs, controlled by, derived from or disciplined by a lesser number of standard (or master) frequencies;

“frequency switching time” means the maximum time (ie delay), when switched from one selected output frequency to another selected output frequency, to reach:

- (a) a frequency within 100 Hz of the final frequency; or
- (b) an output level within 1.0 dB of the final output level.”;

(v) for entry IL1537 there shall be substituted the following entry:

“IL1537 Microwave (including millimetric wave) equipment, capable of operating at frequencies of over 10.5 GHz, the following:

- (a) Rigid and flexible waveguides designed for use at frequencies in excess of 26.5 GHz.....C
- (b) Waveguides having a bandwidth ratio above 1.7:1C
- (c) Directional couplers having a bandwidth ratio above 1.7:1 and directivity over the band of 20 dB or more.....C
- (d) Phased array antennae and sub-assemblies, designed to permit electronic control of beam shaping and pointing, and specially designed components therefor, including duplexers, phase shifters and associated high-speed diode switches.....C

except:

duplexers and phase shifters specially designed for use in civil television systems and in other civil radar or communication systems not specified elsewhere in this Schedule;

- (e) Other antennae specially designed for operation at frequencies above 30 GHz, having a diameter of less than 1 m, and specially designed components thereforC
- (f) Microwave assemblies and sub-assemblies (including active circuit elements), capable of being used at frequencies above 23.6 GHz and having circuits fabricated by the same processes as are used in integrated circuit technology.....C
- (g) Microwave assemblies and sub-assemblies, which contain band-pass or band-stop filters and are capable of operating at 23.6 GHz or moreC
- (h) Amplifiers having an instantaneous bandwidth of more than half an octave (the highest operating frequency being more than 1.5 times the lowest operating frequency)C

except:

parametric or paramagnetic amplifiers which -

- (a) are specially designed for medical applications;
- (b) are specially designed for use in simple educational devices (those designed for use in teaching basic principles and demonstrating the operation of those principles in educational institutions), and operate at industrial, scientific or medical (ISM) frequencies; or
- (c) have an output power of not more than 10 W and are specially designed for -
 - (1) systems for the detection of industrial (or civilian intrusion and related alarm systems;
 - (2) traffic or industrial movement control and counting systems;

- (3) systems for the detection of environmental pollution of air or water; or
- (4) simple educational devices (those designed for use in teaching basic principles and demonstrating the operation of those principles in educational institutions).”;

(h) in Group 3G of Part II of Schedule 1-

(i) for entry IL1565 there shall be substituted the following entry:

“IL1565 Electronic computers, related equipment, equipment or systems containing electronic computers, and technology therefor, the following: and specially designed components for such electronic computers and related equipment:

- (a) analogue computers and related equipment therefor, which are designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below 228 K (- 45°C) to above 328 K (+55°C)..W
- (b) equipment or systems containing analogue computers specified in head (a) above.....W
- (c) analogue computers and related equipment therefor, other than those specified in head (a) above.....W

- except
- (1) those which neither:
 - (A) are capable of containing more than 20 summers, integrators, multipliers or function generators; nor
 - (B) have facilities for readily varying the interconnections of such components;
 - (2) those which have all the following characteristics:
 - (A) they use neither:
 - (a) optical computation devices; nor
 - (b) acoustic wave devices specified in entry IL1586 in Group 3G;
 - (B) the rated errors for summers, inverters and integrators are not less than:
 - (a) static : 0.01%;
 - (b) total at 1 kHz: 0.15%;
 - (C) the rated errors for multipliers are not less than:
 - (a) static : 0.025%;
 - (b) total at 1 kHz: 0.25%;
 - (D) the rated errors for fixed function generators (log and sine/cosine) are not less than:
 - static : 0.1%;
 - (E) they have no more than 350 operational amplifiers; and
 - (F) they have no more than four integrator time scales switchable during one programme;

NOTE

For the purposes of paragraph (2) above-

- 1. the percentage in sub-paragraph (B)(a) applies to the actual output voltage; all the other percentages apply to full scale, that is, from maximum negative to maximum positive reference voltages;
- 2. total errors at 1 kHz for sub-paragraphs (B)(b) and (C)(b) above are to be measured with those resistors incorporated in the inverter, summer or integrator which provide the least error;

3. total error measurements include all errors of the unit resulting from, for example, tolerances of resistors and capacitors, tolerances of input and output impedances of amplifiers, the effects of loading, the effects of phase shift or the generating of functions.
- (d) hybrid computers and related equipment therefor, having all the following characteristicsW
 - (1) the analogue section is specified in head (c) above;
 - (2) the digital section has an internal fixed or alterable storage of more than 2,048 bit; and
 - (3) facilities are included for processing numerical data from the analogue section into the digital section or vice versa;
 - (e) digital computers or analogue computers specified in head (c) above, containing equipment for interconnecting analogue computers with digital computers and whether or not contained in or associated with other equipment or systems.....W
 - (f) digital computers and related equipment therefor, having any of the following characteristics-
 - (1) designed or modified for use in airborne vehicles, missiles or space vehicles and rated for continuous operation at temperatures from below 228 K (-45°C) to above 328 K (+55°C).....W
 - (2) designed or modified to limit electromagnetic radiation to levels much less than those required by government civil interference specificationsW
 - (3) designed as ruggedised or radiation-hardened equipment and capable of meeting military specifications for ruggedised or radiation-hardened equipment.....W
 - (4) modified for military useW
 - (5) designed or modified for certifiable multi-level security or certifiable user isolation applicable to government classified material or to applications requiring an equivalent level of securityW
 - (g) equipment or systems containing digital computers specified in head (f) above.....W
 - (h) digital computers and related equipment therefor, other than those specified in head (e) or (f) above, whether or not contained in or associated with other equipment or systems includingW
 - (A) digital computers and related equipment therefor, designed or modified for-
 - (a) signal processingW
 - (b) image enhancementW
 - (c) local area networksW
except data communication systems located within a single piece of equipment (e.g., television set, car);
 - (d) multi-data-stream processingW
except digital computers and related equipment which:
 - (a) utilise staged (pipelined) instruction interpretation for conventional single instruction single data sequence processing; or
 - (b) have an arithmetic unit implemented with bit-slice microprocessor microcircuits;

- (e) combined recognition, understanding and interpretation of image, continuous (connected) speech or connected word text other than signal processing or image enhancement.....W
 - (f) real time processing of sensor data having both the following characteristicsW
 - (1) concerning events occurring outside the computer using facility; and
 - (2) provided by equipment specified in entry IL1501, IL1502 or IL1510 in Group 3F;
 - (h) fault toleranceW

except:

digital computers and related equipment which utilise:

 - (a) error detection or correction algorithms in main storage;
 - (b) the interconnection of two digital computers so that if the active central processing unit fails an idling but mirroring central processing unit can continue the system's functioning;
 - (c) the interconnection of two central processing units by data channels or by use of shared storage to permit one central processing unit to perform other work until the second central processing unit fails, at which time the first central processing unit takes over in order to continue the system's functioning; or
 - (d) the synchronisation of two central processing units by software so that one central processing unit recognises when the other central processing unit fails and recovers tasks from the failing unit;
 - (j) user-accessible microprogrammabilityW

except digital computers and related equipment whose user-accessible microprogrammability is limited to:

 - (a) loading, reloading or inserting of microprogrammes provided by the supplier; or
 - (b) simple loading of microprogrammes which may or may not be provided by the supplier but which are neither designed to be accessible to the user nor accompanied by training or software for user accessibility;
 - (m) wide area networksW
- (C) related equipment, the following-
- (a) disk drives for rigid magnetic media (hard disks) or non-rigid magnetic media (floppy disks), including cartridge type magnetic disk media, exceeding any of the following limits:
 - (1) a gross capacity of 165 MByteW
 - (2) maximum bit transfer rate:
 - (A) for disk drives for rigid magnetic media (hard disks) - 10.3 million bit/sW
 - (B) for disk drives for non-rigid magnetic media (floppy disks) or cartridge type magnetic disk drives - 16 million bit/s.....W
 - (3) an access rate of 56 accesses per second.....W

- (b) disk drives for optical media (write-once-read- multiple-times (WORM) disks) exceeding any of the following limits:
 - (1) a net capacity of 3.2 GByteW
 - (2) maximum bit transfer rate of 8 million bit/sW
 - (3) an access rate of 15 accesses per second.....W
 - (c) disk drives for erasable optical or magneto-optical media.....W
 - (d) solid state storage equipment, other than main storage, (also known as solid state disks or RAM disks) exceeding a net capacity of 2 MByteW
 - (e) input/output control units designed for use with disk drives or solid state storage equipment, with any of the following characteristics-
 - (1) designed for use with equipment specified in paragraph (h)(C)(a), (b), (c) or (d) above.....W
 - (2) having more than one independent read/write channelW
 - (3) having user-accessible programmability or user-accessible microprogrammabilityW
 or
 - (4) having a transfer rate exceeding 16 million bit/s.W
 - (f) magnetic tape drives exceeding either of the following limits:
 - (1) a maximum bit packing density of 246 bit/mm...W
 or
 - (2) a maximum bit transfer rate of 10 million bit/s..W
 - (g) streamer tape drives with a maximum bit transfer rate exceeding 16 million bit/s.....W
 - (h) input/output control units designed for use with tape drives, with any of the following characteristics-
 - (1) designed for use with tape drives specified in paragraph (h)(C)(f) or (g) above.....W
 - (2) having more than two independent read/write channelsW
 - (3) having user-accessible programmability or user-accessible microprogrammabilityW
 or
 - (4) having a transfer rate exceeding 16 million bit/s.W
 - (i) communication control units or directly connected data channel combinations, exceeding a total transfer rate of 3.6 million bit/s.....W
 - (j) communication control units or communication channel combinations, having a maximum data signalling rate for any communication channel exceeding 9600 bit/s.....W
 - (k) displays or monitors having more than 1,024 resolvable elements in the perpendicular dimension and 1,280 resolvable elements in the other dimension and, except in the case of direct driven video monitors, with more than 256 colours or shades of grey.....W
- except:
1. displays or monitors not specially designed for electronic computers;

2. monochrome displays for systems specially designed for and limited to graphic arts, desktop publishing, document image publishing (e.g., printing, publishing) which have displays not exceeding 1,200 resolvable elements in the perpendicular dimension and 1,600 resolvable elements in the other dimension;

(l) graphic accelerators or graphic coprocessors.....W

There shall be excluded from head (h)-

(C) digital computers (other than those specified in sub-heads (h)(A)(d) to (m) above) and related equipment therefor, having all of the following characteristics-

- (a) shipped as complete systems;
 - (b) designed and announced by the manufacturer for identifiable civil use;
 - (c) not specially designed for any equipment specified in this Schedule;
 - (d) total processing data rate not exceeding 275 million bit/s;
 - (e) total connected net capacity of main storage not exceeding 32 MByte;
 - (f) not including a microprocessor or microcomputer microcircuit with an external data bus width of more than 32 bit or an arithmetic logic unit with an access width of more than 32 bit;
 - (g) not including related equipment specified in sub-head (h)(C) above other than input/output control unit, magnetic disk drive (hard disk) combinations having all of the following characteristics:
 - (1) a total connected net capacity not exceeding 2 GByte;
 - (2) a maximum bit transfer rate of any disk drive not exceeding 20.6 million bit/s; and
 - (3) no more than five independent disk drives exceeding a maximum bit transfer rate of 16 million bit/s;
 - (h) except in the case of workstations designed for and limited to graphic arts (e.g., printing, publishing), not having both of the following characteristics-
 - (1) they are stand-alone graphics work stations designed or modified for the generation, transformation and display of two- or three- dimensional vectors; and
 - (2) they exceed either of the following limits:
 - (A) block move data rate of 3-million pixels per second; or
 - (B) maximum bit transfer rate of the channel for direct access to the main storage (Direct Memory Access (DMA) channel) of 15 million bit/s; and
 - (i) not including equipment specified in sub-head (a)(2) of entry IL1519 in Group 3F or in entry IL1567 in this Group;
- (D) graphic accelerators or graphic coprocessors not exceeding a block move data rate of 3 million pixels per second;
- (E) related equipment for signal processing or image enhancement or both not exceeding an equivalent multiply rate of 6.5 million operations per second;

- (F) related equipment for local area networks, not exceeding a data signalling rate of 20 million bit/s and having no inter-network gateways, or related equipment specially designed for connecting local area networks within a computer using facility;
- (G) digital computers or related equipment therefor, provided that:
 - (a) they are for medical applications;
 - (b) they are substantially restricted to medical applications by reason of their design and performance;
 - (c) they do not have user-accessible programmability other than that allowing for insertion of the original or modified programmes supplied by the original manufacturer;
 - (d) in the case of computers or equipment for signal processing, image enhancement or multi-data-stream processing, it
 - (1) is essential for the medical application; and
 - (2) is designed or modified for the identifiable and dedicated medical application;
 - (e) in the case of any digital computer which is not designed or modified but is essential for the medical application, it does not exceed a total processing data rate of 550 million bit per second;
- (H) digital computers or related equipment, contained in or associated with other equipment or systems where-
 - (a) the computer or related equipment is essential for the operation of that other equipment or systems; and
 - (b) the computer or related equipment is not a principal element of that other equipment or system;
- (j) Technology, the following-
 - (1) technology applicable to the-
 - (A) development, production or use (i.e., installation, operation and maintenance) of electronic computers or related equipment, whether or not such electronic computers or related equipment are specified in this entryD except-
 - (a) technology which is unique to related equipment not specified in this Schedule;
 - (b) the minimum technical information necessary for the use of electronic computers or related equipment when shipped together with or solely for use with such electronic computers or related equipment; or
 - (c) the minimum technical information for the production of electronic computers and related equipment not specified in sub-head (h)(A) or related equipment excluded by exception (C) to head (h), being information relating to -
 - (1) assembling of prefabricated components or sub-assemblies;
 - (2) loading of basic diagnostic systems software;
 - (3) performing basic go/no go testing of finished products;

NOTE: "assembling" means for the purpose of this exception, the testing, and integrating into finished products, of components and sub-assemblies, including mounting components on to printed circuit boards or into other assemblies.

- (B) development, production or use of equipment or systems specified in head (b) or (g) of this entryD
- (2) technology for the integration of-
- (A) electronic computers or related equipment specified in this Schedule into other equipment or systems, whether or not the other equipment or systems are specified in this entry.D
- except:
- technology for the integration of computers or related equipment into other equipment or systems, which is unique to such other equipment or systems provided that such other equipment or systems are not specified in this Schedule;
- (B) electronic computers or related equipment not specified in this Schedule, into equipment or systems specified in this entryD

In this entry-

"access rate"-

- (a) of an input/output control unit drum or disk drive combination (R_{ad}) means either the access rate of an input/output control unit (R_{ac}) or the sum of the individual access rates of all independent seek mechanisms (R_{as}), whichever is smaller;

Thus: $R_{ad} = \min (R_{ac} ; \text{SUM } R_{as})$;

- (b) of an input/output control unit (R_{ac}) -

- (1) with rotational position sensing (rps), means the sum of the individual access rates of all independent seek mechanisms (R_{as}) connected to the control unit;

Thus: $R_{ac} = \text{SUM } R_{as}$ (with rps);

- (2) without rotational position sensing (rps), means the number (C) of independent read/write channels connected to the control unit divided by the least latency time (t_{lmin}) of any connected independent seek mechanism;

Thus: $R_{ac} = \frac{C}{t_{lmin}}$ (without rps);

- (c) of a seek mechanism (R_{as}), means the reciprocal of the average access time (t_{aa}) of the seek mechanism;

Thus: $R_{as} = \frac{1}{t_{aa}}$;

For the purpose of this definition-

"average access time" of a seek mechanism (t_{aa}) means the sum of the average seek time (t_{sa}) and the latency time (t_l);

Thus: $t_{aa} = t_{sa} + t_l$;

"average seek time" (t_{sa}) means the sum of the maximum seek time (t_{smax}) and twice the minimum seek time (t_{smin}), divided by three;

Thus: $t_{sa} = \frac{t_{smax} + 2t_{smin}}{3}$

"maximum seek time" (t_{smax})

- (1) for fixed head devices, is zero;
- (2) for moving head or moving media devices, means the rated time to move between the two most widely separated tracks;

“minimum seek time” (t_{smin})

- (1) for fixed head devices, is zero;
- (2) for moving head or moving media devices, means the rated time to move from one track to an adjacent track.

“latency time” (t_l) means the rotational period divided by twice the number of independent read/write heads per track;

“analogue computer” means equipment which can, in the form of one or more continuous variables:

- (a) accept data;
- (b) process data; and
- (c) provide output of data;

“associated” with equipment or systems means:

- (a) can feasibly be either:
 - (1) removed from such equipment or systems; or
 - (2) used for other purposes; and
- (b) is not essential to the operation of such equipment or systems;

“block move data rate” means the maximum number of pixels which can be moved per second from one location to another in the storage which functions as the frame buffer;

“computer using facility” means the end-user’s contiguous and accessible facilities:

- (a) housing the computer operating area and those end-user functions which are being supported by the electronic computer and its related equipment; and
- (b) not extending beyond 1,500 metres in any direction from the centre of the computer operating area;

for the purpose of this definition-

“computer operating area” means the immediately contiguous and accessible area around the electronic computer, where the normal operating, support and service functions take place;

“data device” means equipment capable of transmitting or receiving sequences of digital information;

“data signalling rate” means that rate as defined in ITU Recommendation 53-36, taking into account that, for non-binary modulation, baud and bit per second are not equal. Binary digits for coding, checking and synchronisation functions are included;

N.B.: It is the maximum one-way rate, i.e., the maximum rate in either transmission or reception, whichever is the greater;

“digital computer” means equipment which can, in the form of one or more discrete variables:

- (a) accept data;
- (b) store data or instructions in fixed or alterable (writable) storage devices;
- (c) process data by means of a stored sequence of instructions which is modifiable; and
- (d) provide output of data;

N.B.: Modifications of a stored sequence of instructions include replacement of fixed storage devices, but not a physical change in wiring or interconnections;

“electronic computer” does not include related equipment which contains an electronic computer, but which lacks user-accessible programmability;

“equivalent multiply rate” means the maximum achievable number of multiplication operations which can be performed per second considering that, in the case of simultaneous multiplication operations, all multiplication rates have to be summed in order to arrive at the equivalent multiply rate:

- (a) assuming
 - (1) optimal operand locations in the most immediate storage; and
 - (2) operand lengths at least 16 bit, or more if this allows for faster operation; and
- (b) ignoring
 - (1) set-up operations;
 - (2) pipeline filling operations;
 - (3) initialization;
 - (4) interrupts; and
 - (5) data reordering times;

N.B.: Simultaneous multiplication operations can occur because of:

- (a) multiple arithmetic units for operations such as complex multiplication, convolution or recursive filtering;
- (b) parallel pipelining;
- (c) more than one arithmetic unit in one data processing unit; or
- (d) more than one data processing unit in one system.

“fault tolerance” means the ability to perform correctly without human intervention after failure of any assembly, so that there is no single point in the system the failure of which could cause catastrophic failure of the system’s functioning;

“gateway” means the function, realised by any combination of equipment and software, of carrying out the conversion of conventions for representing, processing or communicating information used in one system into the corresponding but different conventions used in another system;

“gross capacity” means the product of:

- (a) the maximum number of binary digit (bit) positions per unformatted track; and
- (b) the total number of tracks including spare tracks and tracks not accessible to the user;

“hybrid computer” means equipment which can:

- (a) accept data;
- (b) process data, in both analogue and digital representations; and
- (c) provide output of data;

“image digitiser” means a device for directly converting an analogue representation of an image into a digital representation;

“image enhancement” means the processing of externally derived information-bearing images by algorithms such as time compression, filtering, extraction, selection, correlation, convolution or transformations between domains (e.g., fast Fourier transform or Walsh transform). This does not include algorithms using only linear or rotational transformation of a single image, such as translation, feature extraction, registration or false colouration;

“internetwork gateway” means a gateway for two systems which are themselves local area networks, wide area networks or both;

“local area network” means a data communication system which:

- (a) allows any number of independent data devices to communicate directly with each other; and
- (b) is confined to a geographical area of moderate size (e.g., office building, plant, campus, warehouse);

“main storage” means the primary storage for data or instructions for rapid access by a central processing unit. It consists of the internal storage of a digital computer and any hierarchical extension thereto, such as cache storage or non-sequentially accessed extended storage;

N.B.: For the determination of the size of main storage the cache storage is excluded, provided that:

- (a) its size does not exceed 6.25% (1/16th) of the size of main storage excluding cache storage; and
- (b) it is designed to contain only data already contained in main storage;

“maximum bit packing density” means the density of recording specified in accordance with the appropriate ANSI or ISO Standard (e.g. ANSI X3.14-1979, ISO 1863-1975; ANSI X3.22-1973, ISO 1873-1976; ANSI X3.39-1973, ISO 3788-1976; ANSI X3.48-1977, ISO 3407-1976; ANSI X3.56-1977, ISO 4057-1979; ANSI X3.54-1976);

“maximum bit transfer rate”

- (a) of a drum or disk drive (R_{tdmax}), means the product of:
 - (1) the maximum number of binary digit (bit) positions per unformatted track; and
 - (2) the number of tracks which simultaneously can be read or written, divided by the rotational period;
- (b) of a magnetic tape drive (R_{ttmax}), means the product of:
 - (1) the maximum bit packing density;
 - (2) the number of data bits per character (ANSI) or per row (ISO); and
 - (3) the maximum tape read/write speed;

“most immediate storage” means the portion of the main storage most directly accessible by the central processing unit:

- (a) for single level main storage, this is the internal storage;
- (b) for hierarchical main storage, this is:
 - (1) the cache storage;
 - (2) the instruction stack; or
 - (3) the data stack;

“multi-data-stream processing” means the microprogramme or equipment architecture technique which permits processing two or more data sequences under the control of one or more instruction sequences by means such as:

- (a) parallel processing;
- (b) structured arrays of processing elements;
- (c) Single Instruction Multiple Data (SIMD) operations; or
- (d) Multiple Instruction Multiple Data (MIMD) operations;

“net capacity” of a drum, disk or cartridge-type streamer tape drive or a bubble memory, means the total capacity designed to be accessible to the digital computer excluding error control bits;

an element is a “principal element” when its replacement value is more than 35% of the total value of the system of which it is an element. Element value is the cost of the element for the manufac-

turer of the system, or for the system integrator. Total value is the normal international selling price to unrelated parties at the point of manufacture or consolidation of shipment;

“real time processing” means processing of data by an electronic computer in response to an external event according to time requirements imposed by the external event;

“related equipment” means the following equipment, contained in or associated with an electronic computer:

- (a) equipment for interconnecting analogue computers with digital computers;
- (b) equipment for interconnecting digital computers;
- (c) equipment for interfacing electronic computers to local area networks or to wide area networks;
- (d) communication control units;
- (e) other input/output control units;
- (f) recording or reproducing equipment; or
- (g) displays;

“signal processing” means the processing of externally derived information-bearing signals by algorithms such as time compression, filtering, extraction, selection, correlation, convolution or transformations between domains (e.g., fast Fourier transform or Walsh transform);

“total processing data rate” -

- (a) of a single central processing unit, is its processing data rate;
- (b) of multiple central processing units which do not share direct access to a common main storage, is the individual processing data rate of each central processing unit, i.e., each unit is separately treated as a single central processing unit as in (a) above;
- (c) of multiple central processing units which partially or fully share direct access to a common main storage at any level, is the sum of:
 - (1) the highest of the individual processing data rates of all central processing units; and
 - (2) 0.75 times the processing data rate of each remaining central processing unit, sharing the same main storage;assuming the configuration of equipment which would maximize this sum of rates.

For the purpose of this definition-

“processing data rate” is the maximum of the floating point processing data rate (R_F) or the fixed point processing data rate (R_X);

N.B.: The processing data rate of a central processing unit implemented with two or more microprocessor microcircuits, not including any dedicated micro-processor microcircuit used solely for display, keyboard or input/output control, is the sum of the individual processing data rates of all these microprocessor microcircuits.

“floating point processing data rate” (R_F) is the sum of:

- (1) 0.85 times the number of bits in a fixed point instruction (n_{ix}) or 0.85 times the number of bits in a floating point instruction (n_{if}), if no fixed point instructions are implemented;
- (2) 0.15 times the number of bits in a floating point instruction (n_{if});

- (3) 0.40 times the number of bits in a fixed point operand (n_{OX}) or 0.40 times the number of bits in a floating point operand (n_{Of}), if no fixed point instructions are implemented; and
- (4) 0.15 times the number of bits in a floating point operand (n_{Of});

divided by the sum of:

- (1) 0.85 times the execution time for a fixed point addition (t_{ax}) or for a floating point addition (t_{af}), if no fixed point instructions are implemented;
- (2) 0.09 times the execution time for a floating point addition (t_{af}); and
- (3) 0.06 times the execution time for a floating point multiplication (t_{mf}) or for the fastest available subroutine (t_{msub}) to simulate a floating point multiplication instruction, if no floating point multiplication instructions are implemented;

Thus:

$$R_f = \frac{(0.85)n_{iX} + (0.15)n_{if} + (0.40)n_{OX} + (0.15)n_{Of}}{(0.85)t_{ax} + (0.09)t_{af} + (0.06)t_{mf}}$$

or if no fixed point instructions are implemented, then:

$$R_f = \frac{(1.00)n_{if} + (0.55)n_{Of}}{(0.94)t_{af} + (0.06)t_{mf}}$$

or if no floating point multiplication instructions are implemented ($t_{mf} = t_{msub}$), then:

$$R_f = \frac{(0.85)n_{iX} + (0.15)n_{imf} + (0.40)n_{OX} + (0.15)n_{Of}}{(0.85)t_{ax} + (0.09)t_{af} + (0.06)t_{msub}}$$

N.B.: If a digital computer has neither floating point addition nor floating point multiplication instructions, then its floating point processing data rate is equal to zero;

“fixed point processing data rate” (R_X) is the sum of:

- (1) 0.85 times the number of bits in a fixed point addition instruction (n_{iaX});
- (2) 0.15 times the number of bits in a fixed point multiplication instruction (n_{imX}); and
- (3) 0.55 times the number of bits in a fixed point operand (n_{OX});

divided by the sum of:

- (1) 0.85 times the execution time for a fixed point addition (t_{ax}); and
- (2) 0.15 times the execution time for a fixed point multiplication (t_{mX}) or for the fastest available subroutine (t_{msub}) to simulate a fixed point multiplication instruction if no fixed point multiplication instructions are implemented;

Thus:

$$R_X = \frac{(0.85)n_{iaX} + (0.15)n_{imX} + (0.55)n_{OX}}{(0.85)t_{ax} + (0.15)t_{mX}}$$

or if no fixed point multiplication instructions are implemented ($t_{mX} = t_{msub}$), then:

$$R_X = \frac{(0.85)n_{iaX} + (0.15)n_{imX} + (0.55)n_{OX}}{(0.85)t_{ax} + (0.15)t_{msub}}$$

N.B.: If a digital computer has neither fixed point addition nor fixed point multiplication instructions, then its fixed point processing data rate is equal to zero.

“number of bits” in a:

fixed point addition instruction (n_{iax}) -

fixed point multiplication instruction (n_{imx}) -

floating point addition instruction (n_{iaf}) -

floating point multiplication instruction (n_{imf})-

means the number of bits in the appropriate shortest single fixed or floating point instruction length which permits full direct addressing of the main storage;

N.B.: 1. When multiple instructions are required to simulate an appropriate single instruction, the number of bits in the above instructions is 16 bits plus the number of bits (b_{iax} , b_{imx} , b_{iaf} , b_{imf}) which permits full direct addressing of the main storage.

Thus: $n_{iax} = 16 + b_{iax}$;
 $n_{imx} = 16 + b_{imx}$;
 $n_{iaf} = 16 + b_{iaf}$;
 $n_{imf} = 16 + b_{imf}$;

N.B.: 2. If the addressing capability of an instruction is expanded by using a base register, then the number of bits in an instruction, fixed or floating point, addition or multiplication, is the number of bits in the instruction with the standard address length including the number of bits necessary to use the base register.

“number of bits in a fixed point operand” (n_{ox}) is -

(a) the shortest fixed point operand length; or

(b) 16 bit;

whichever number is higher;

“number of bits in a floating point operand” (n_{of}) is -

(a) the shortest floating point operand length; or

(b) 30 bit;

whichever number is higher;

and for the purpose of these definitions “execution time” is

(a) the time certified or openly published by the manufacturer for the execution of the fastest appropriate instruction under the following conditions:

(1) no indexing or indirect operations are included;

(2) the instruction is in the most immediate storage;

(3) one operand is in the accumulator or in a location of the most immediate storage which is acting as the accumulator;

(4) the second operand is in the most immediate storage; and

(5) the result is left in the accumulator or the same location in the most immediate storage which is acting as the accumulator;

(b) if only the maximum and minimum execution times of the instructions are published, the sum of:

(1) the maximum execution time of an instruction (t_{max}); and

(2) twice the minimum execution time of this instruction (t_{\min});

divided by three;

$$\text{Thus: } t = \frac{t_{\max} + 2t_{\min}}{3}$$

(t stands for any of the values t_{ax} , t_{af} , t_{mx} or t_{mf});

- (c) for central processing units which simultaneously fetch more than one instruction from one storage location, the average of the execution times when executing instructions fetched from all possible locations within the stored word;
- (d) if the longest fixed point operand length is smaller than 16-bit, the time required for the fastest available subroutine to simulate a 16 bit fixed point operation;

NOTE: 1. If the addressing capability of an instruction is expanded by using a base register, then the execution time shall include the time for adding the content of the base register to the address part of the instruction.

2. When calculating processing data rate for computers with cache sizes smaller than 64 K Bytes, the execution time of the appropriate instructions shall be calculated as follows:

(cache hit rate) x (execution time when both instruction and operand are in cache storage) + (1 - cache hit rate) x (execution time when neither instruction nor operand are in cache storage),

the "cache hit rate" being:

1.00 for cache size of 64 KByte or more

0.95 " 32 "

0.90 " 16 "

0.85 " 8 "

0.75 " 4 "

0.65 " 2 "

0.50 " 1 "

The cache hit rate for computers with cache sizes smaller than 1 kByte shall be treated as zero.

"total transfer rate" -

(a) of input/output control unit drum, disk or cartridge-type streamer tape drive combinations (R_{tdtot}), is the sum of the individual transfer rates of all input/output control unit drum, disk or cartridge-type streamer tape drive combinations (R_{td}) provided with the system which can be sustained simultaneously, assuming the configuration of equipment which would maximize this sum of rates;

$$\text{Thus: } R_{tdtot} = \text{SUM } R_{td}$$

(b) of input/output control unit magnetic tape drive combinations (R_{tttot}) including cartridge tape streamer tape drive combinations, means the sum of the individual transfer rates of all input/output control unit magnetic tape drive combinations (R_{tt}) provided with the system which can be sustained simultaneously, assuming the configuration of equipment which would maximize this sum of rates;

$$\text{Thus: } R_{tttot} = \text{SUM } R_{tt}$$

(c) of input/output or communication control unit directly connected data channel combinations, means the sum of the individual transfer rates of all data channels provided with the system which can be sustained simultaneously, assuming

the configuration of equipment which would maximize this sum of rates.

For the purpose of this definition, "transfer rate" -

- (1) of an input/output control unit drum or disk drive combination (R_{td}) other than a cartridge-type streamer tape drive combination, is the smaller of either:
 - (A) the input/output control unit transfer rate (R_{tc}); or
 - (B) the sum of the individual transfer rates of all independent seek mechanisms (R_{ts});

Thus: $R_{td} = \min (R_{tc}; \text{SUM } R_{ts})$

- (2) of an input/output control unit (R_{tc})
 - (A) with rotational position sensing (rps), is the product of:
 - (a) the number of independent read/write channels (C); and
 - (b) the highest maximum bit transfer rate ($R_{tsmaxmax}$) of all independent seek mechanisms; or
 - (B) without rotational position sensing (rps), is two-thirds of this product;

Thus:

$$R_{tc} = C \cdot R_{tsmaxmax} \text{ (with rps)}$$

$$R_{tc} = \frac{2C \cdot R_{tsmaxmax}}{3} \text{ (without rps)}$$

- (3) of an independent seek mechanism (R_{ts}), is the product of:
 - (A) the maximum bit transfer rate (R_{tsmax}); and
 - (B) the rotational period (t_r);
 divided by the sum of:
 - (A) the rotational period (t_r);
 - (B) the minimum seek time (t_{smin}); and
 - (C) the latency time (t_l);

$$\text{Thus: } R_{ts} = \frac{R_{tsmax} \times t_r}{t_r + t_{smin} + t_l}$$

- (4) of an input/output control unit cartridge-type streamer or magnetic tape drive combination (R_{tt}), is the product of:
 - (1) the number of independent read/write channels (C); and
 - (2) the highest maximum bit transfer rate ($R_{ttmaxmax}$) of all tape drives;

Thus: $R_{tt} = C \cdot R_{ttmaxmax}$

"minimum seek time" (t_{smin}) -

- (1) for fixed head devices, is zero; or
- (2) for moving head or moving media devices, is the rated time to move from one track to an adjacent track;

"latency time" (t_l) is the rotational period divided by twice the number of independent read/write heads per track;

"user-accessible microprogrammability" means the facility allowing a user to insert, modify or replace microprogrammes;

“user-accessible programmability” means the facility allowing a user to insert, modify or replace programmes by means other than:

- (a) a physical change in wiring or interconnections; or
- (b) the setting of function controls including entry of parameters;

“wide area network” means a data communication system which:

- (a) allows an arbitrary number of independent data devices to communicate with each other;
- (b) may include local area networks; and
- (c) is designed to interconnect geographically dispersed facilities.

Any term used in this entry shall bear the meaning it has in entry IL1566 in this Group.”;

(ii) for entry IL1566 there shall be substituted the following entry:

“IL1566 Software and technology therefor, the following:

NOTE: Software for equipment described in entry IL1565 is dealt with in this entry. Specially designed ODMA software for equipment described in other entries in this Schedule except entry IL1565, is dealt with in the appropriate entry.

(a) Software, the following:

(1) software designed or modified for any computer that is part of a computer series designed and produced in any country specified in Schedule 2 to this Order.....W

except application software designed for and limited to:

- (A) accounting, general ledger, inventory control, payroll, accounts receivable, personnel records, wages calculation or invoice control;
- (B) data and text manipulation such as sort/merge, text editing, data entry or word processing;
- (C) data retrieval from established data files for purposes of report generation or inquiry for the functions described in (A) or (B) above; or

(D) the non real time processing of pollution sensor data at fixed sites or in civil vehicles for civil environmental monitoring purposes;

(2) software designed or modified for the design, development or production of items specified in this ScheduleW

(3) software designed or modified for:

(A) hybrid computers specified in entry IL1565 in this Group.....W

(B) one or more of the functions referred to in paragraphs (A)(a) to (m) of head (h) of entry IL1565 or for digital computers or related equipment designed or modified for such functionsW

except

(a) specially designed software in machine executable form for digital computers and related equipment therefor which are excluded by exception (G) or (H) to head (h) of entry IL1565;

(b) software for equipment specified in paragraph (A)(c) or (m) of head (h) of entry IL1565 unless the software performs:

- (1) multi-data-stream processing or load sharing functions; or
- (2) datagram or fast select functions as defined in level III of CCITT X.25 or equivalent;
- (4) software for computer-aided design, manufacture, inspection or test of items specified in this Schedule.....W
- (5) software designed or modified to provide certifiable multi-level security or certifiable user-isolation applicable to government-classified material or to applications requiring an equivalent level of security, or software to certify such softwareW
- (6) software specially designed for computer aided design (CAD) of patterned substrates, having any of the following characteristics:-
 - (A) automatically transforming schematic functional descriptions into pattern layouts.....W
 - (B) simulation of the performance of the circuit layout.W
 - (C) automatic generation of test string lists (i.e., test vectors) for substrates having more than two layers (including the ground plane) of interconnectionsW
 - (D) automatic placement or routing which is designed for performing impedance matching or crosstalk analysis and crosstalk matchingW
 except automatic software for the generation of test string lists for continuity testing of substrates.
- (b) Software, the following:
 - (1) development systems, the following:
 - (A) development systems employing high-level language and designed for or containing programmes or databases special to the development or production of:
 - (a) specially designed software specified elsewhere in this ScheduleW
 - (b) software specified in sub-head (a)(2) or (a)(3) of this entry, including any subset designed or modified for use as part of such a development system.....W
 - (B) development systems employing high-level language and designed for or containing the software tools and databases for the development or production of software or any subset designed or modified for use as part of a development system such as, or equivalent to:
 - (a) Ada Programming Support Environment (APSE)..W
 - (b) any subset of APSE, the following:
 - (1) Kernel APSEW
 - (2) Minimal APSEW
 - (3) Ada compilers specially designed as an integrated subset of APSE.....W
 - or
 - (4) any other subset of APSEW
 - (c) any superset of APSEW
 - or
 - (d) any derivative of APSEW
 - (2) programming systems, the following:

- (A) cross-hosted compilers and cross-hosted assemblersW
- (B) compilers or interpreters designed or modified for use as part of a development system specified in sub-head (1) aboveW
- (C) disassemblers, decompilers or other software which converts programmes in object or assembly language into a higher level language.....W
except simple debugging application software, such as mapping, tracing, check-point/restart, breakpoint, dumping and the display of the storage contents or their assembly language equivalent;
- (3) diagnostic systems or maintenance systems, designed or modified for use as part of a development system specified in sub-head (1) above.....W
- (4) operating systems, the following:
 - (A) operating systems designed or modified for digital computers or related equipment, exceeding any of the following limits;
 - (1) central processing unit storage combinations-
 - (a) total processing data rate of 1000 million bit/s;
 - (b) total connected capacity of main storage of 128 MByteW
 - (2) input/output control unit, drum or disk drive combinations-
 - (a) total connected net capacity of 12 GByte;
 - (b) maximum bit transfer rate of any drum or disk drive of 25 million bit/sW
 - (B) operating systems providing on-line transaction data processing which permits integrated teleprocessing and on-line updating of databasesW
- (5) application software, the following:
 - (A) software for cryptologic or cryptanalytic applicationsW
 - (B) artificial intelligence software, including expert system software, which enables a digital computer to perform functions that are normally associated with human perception and reasoning or learningW
 - (C) database management systems which are designed to handle distributed databases for:
 - (a) fault tolerance by using techniques such as maintenance of duplicated databasesW
or
 - (b) integrating data at a single site from independent remote databases.....W
 - (D) software designed to adapt software resident on one digital computer for use on another digital computerW
except software to adapt between two digital computers not specified in entry IL1565;
 - (E) software to provide adaptive control and having both the following characteristics.....W

(a) for flexible manufacturing units (FMUs) which include equipment described in (b)(1) and (b)(2) of the definition of flexible manufacturing unit below; and

(b) capable of generating or modifying, in real time processing, programmes or data by using the signals obtained simultaneously by means of at least two detection techniques, such as:

- (1) machine vision (optical ranging);
- (2) infrared imaging;
- (3) acoustical imaging (acoustical ranging);
- (4) tactile measurement;
- (5) inertial positioning;
- (6) force measurement;
- (7) torque measurement;

except software which only provides rescheduling of functionally identical equipment within flexible manufacturing units using pre-stored part programmes and a pre-stored strategy for the distribution of the part programmes;

(c) Technology applicable to the development, production or use (i.e., installation, operation and maintenance) of software, whether or not the software is specified in this entryD
except:

- (1) technical data in the public domain;
- (2) the minimum technical information necessary for the use of software not specified in this entry.

There shall be excluded from this entry-

1. software not exceeding 5,000 statements in source language, excluding data, provided that:
 - (a) the software is neither designed nor modified for use as a module of a larger software module or system which in total exceeds this limit; and
 - (b) the software is not specified in sub-head (b)(5) above;
2. software initially exported to a country specified in Schedule 2 to this Order prior to 1st January, 1984, provided that:
 - (a) the software is identical to and in the same language form (source or object) as that initially exported, allowing minor updates for the correction of errors which do not modify the initially exported functions;
 - (b) the accompanying documentation does not exceed the level of the initial export; and
 - (c) the software is exported to the same destination as the initial export;
3. the minimum technical information for the use (i.e., installation, operation and maintenance) of software licensed for export, when shipped together with or solely for use with such software;
5. software which is either:
 - (a) standard commercially available software:
 - (1) designed for installation by the user without further support by the supplier; and
 - (2) designed for use on digital computers and related equipment therefor which are excepted by paragraph (C) to head (h) of entry IL1565 in this Group; and
 - (3) generally available to the public; or

(b) software in the public domain.

In this entry:

“adaptive control” means a control system that adjusts the response from conditions detected during the operation;

“application software” means software other than development systems, diagnostic systems, maintenance systems, operating systems and programming systems not falling within any of the other defined categories of software;

“cross-hosted programming systems” means programming systems which produce programmes for a model of electronic computer different from that used to run the programming system, that is, they have code generators for equipment different from the host computer;

“database” means a collection of data for one or more particular applications, which is physically located and maintained in one or more electronic computers or related equipment;

“data base management systems” means application software to manage and maintain a database in one or more prescribed logical structures for use by other application software independent of the specific methods used to store or retrieve the database;

“data device” means equipment capable of transmitting or receiving sequences of digital information;

“development systems” means software to develop or produce software, including software to manage those activities. Examples of a development system are programming support environments, software development environments and programmer-productivity aids;

“diagnostic systems” means software to isolate or detect software or equipment malfunctions;

“distributed database” means a database which is physically located and maintained in part or as a whole in two or more interconnected electronic computers or related equipment, so that inquiries from one location can involve database access in other interconnected electronic computers or related equipment;

“flexible manufacturing unit” (FMU) (sometimes also referred to as flexible manufacturing system (FMS) or flexible manufacturing cell (FMC)) means a combination of at least:

(a) a digital computer including its own main storage and its own related equipment; and

(b) two or more of the following:

(1) a machine tool for removing, cutting or spark eroding metals, ceramics or composites;

(2) a computer controlled or numerically controlled dimensional inspection machine or a digitally controlled measuring machine specified in head (c) of entry IL1099 in Group 3A;

(3) a robot specified in entry IL1391 in Group 3D;

(4) digitally controlled equipment specified in entry IL1080, IL1081, IL1086 or IL1088 in Group 3A;

(5) stored-programme-controlled equipment specified in head (b) of entry IL1355 in Group 3D;

(6) digitally controlled equipment specified in entry IL1357 in Group 3D;

(7) digitally controlled electronic equipment specified in entry IL1529 in Group 3F;

“generally available to the public” means

- (a) available at retail selling points, other than those specializing in selling electronic computers to the general public in model series which are not excepted by paragraph (C) to head (h) of entry IL1565 in this Group; and
- (b) sold from stock by means of:
 - (1) over-the-counter transactions;
 - (2) mail order transactions;
 - (3) telephone call transactions;

“high-level language” means a programming language that does not reflect the structure of any one given electronic computer or that of any one given class of electronic computers;

“maintenance systems” means software to:

- (a) modify software or its associated documentation in order to correct faults, or for other updating purposes; or
- (b) maintain equipment;

“on-line updating” means processing in which the contents of a database can be amended within a period of time useful to interact with an external request;

“operating systems” means software to control:

- (a) the operation of a digital computer or of related equipment; or
- (b) the loading or execution of programmes;

“programming systems” means software to convert a convenient expression of one or more processes (source code or source language) into equipment executable form (object code or object language);

“self-hosted software for programming systems” means software to produce programmes for the same model of electronic computer as that used to run the programming system, i.e., they only have code generators for the host computer;

“standard commercially available” means for software that which is:

- (a) commonly supplied to general purchasers or users of equipment in countries specified in Schedule 2 to this Order, but not precluding the personalization of certain parameters for individual customers wherever located;
- (b) designed and produced for civil applications;
- (c) not designed or modified for any digital computer which is part of a digital computer series designed and produced in a country specified in Schedule 2; and
- (d) supplied in a commonly distributed form.

Any term used in this entry shall bear the meaning it has in entry IL1565 in this Group.”;

(iii) for entry IL1567 there shall be substituted the following entry:

“IL1567 Stored-programme-controlled, communication switching equipment or systems and technology therefor, the following: and specially designed components therefor and specially designed ODMA software for the use of such equipment or systems -

- (a) Communication equipment or systems for data (message) switching (including those for local area networks or for wide area networks)W
except data (message) switching equipment or systems, provided that -

- (1) the equipment or systems are designed for fixed civil use according to the requirements of either:
 - (A) CCITT Recommendations F.1 to F.79 for store-and-forward systems (Volume II - Fascicle II.4, VIIIth plenary assembly, 10th-21st November, 1980); or
 - (B) ICAO Recommendations for store-and-forward civil aviation communication networks (Annex 10 to the Convention on International Civil Aviation, including all amendments agreed up to and including 14th December 1981, published by ICAO);
- (3) the maximum data signalling rate of any circuit does not exceed 9,600 bit/s;
- (4) the equipment or systems do not contain digital computers or related equipment specified in -
 - (A) head (f) of entry IL1565 in this Group; or
 - (B) paragraphs (a),(b) or (d) to (j) (inclusive) of sub-head (h)(A) of entry IL1565;
- (5) the software supplied:
 - (A) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment and systems and is in machine executable form; and
 - (B) does not include software -
 - (a) specified in entry IL1527 in Group 3F, in sub-head (a)(5) in entry IL1566 in this Group or in entry ML11 in Group 1, or
 - (b) that permits user-modification of generic software or its associated documentation; and
- (6) the equipment or systems are designed for installation by the user without support from the supplier;
- (b) Communication equipment or systems for stored- programme-controlled circuit switching..... W
except:
 - (1) key telephone systems, provided that -
 - (A) access to an external connection is obtained by pressing a special button (key) on a telephone, rather than by dial or key-pad as on a PABX;
 - (B) they are not designed to be upgraded for use as PABXs;
 - (C) the software supplied:
 - (a) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment or systems, and is in machine-executable form; and
 - (b) does not include software:
 - (1) specified in entry IL1527 in Group 3F, in sub-head (a)(5) in entry IL1566 in this Group or in entry ML11 in Group 1, or
 - (2) that permits user-modification of generic software or its associated documentation; and
 - (D) the equipment or systems are designed for installation by the user without support from the supplier;
 - (2) stored-programme-controlled circuit switching equipment or systems, provided that -

- (A) the equipment or systems are designed for fixed civil use in stored-programme-controlled telegraph circuit switching for data;
- (C) the equipment or systems do not contain digital computers or related equipment specified in head (f) of entry IL1565 or in paragraphs (a) to (j) inclusive or paragraph (m) of sub-head (h)(A) of entry IL1565;
- (D) the equipment or systems do not have either of the following characteristics:
 - (a) multi-level call pre-emption (including over-riding or seizing of busy subscriber lines, trunk circuits or switches), other than for single-level call pre-emption (such as executive override); or
 - (b) common channel signalling;
- (E) the maximum internal bit rate per channel does not exceed 9,600 bit/s;
- (F) the telegraph circuits (whether or not operating as telephone circuits) are capable of carrying any type of telegraph or telex signal compatible with a voice channel bandwidth of 3,100 Hz;
- (G) the software supplied:
 - (a) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment or systems and is in machine-executable form; and
 - (b) does not include software:
 - (1) specified in entry IL1527 in Group 3F or in sub-head (a)(5) in entry IL1566 in this Group or in entry ML11 in Group 1;
 - (2) that permits user-modification of generic software or its associated documentation; and
- (H) the equipment or systems are designed for installation by the user without support from the supplier;
- (3) stored-programme-controlled, telephone circuit switching equipment or systems, provided that -
 - (A) the equipment or systems are designed for fixed civil use as space-division analogue exchanges or time-division analogue exchanges which are PABXs;
 - (B) the equipment or systems do not contain digital computers or related equipment specified in head (f) of entry IL1565 in this Group, or in paragraphs (a) to (j) inclusive or paragraph (m) of sub-head (h)(A) of entry IL1565;
 - (C) any communication channels or terminal devices used for administrative and control purposes:
 - (a) can only be used for those purposes; and
 - (b) do not exceed a maximum data signalling rate of 9,600 bits;
 - (D) voice channels are limited to 3,100 Hz;
 - (F) the equipment or systems do not have:
 - (a) multi-level call pre-emption (including overriding or seizing of busy subscriber lines, trunk circuits or switches) other than for single-level call pre-emption (such as executive override); or
 - (b) common channel signalling;

(G) the software supplied:

(a) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment or systems; and is in machine-executable form; and

(b) does not include software:

(1) specified in entry IL1527 in Group 3F, or in sub-head (a)(5) in entry IL1566 in this Group or in entry ML11 in Group 1; or

(2) that permits user-modification of generic software or its associated documentation; and

(H) the equipment or systems are designed for installation by the user without support from the supplier;

(4) stored-programme-controlled, telephone circuit switching equipment or systems, provided that:

(A) the equipment or systems are designed for fixed civil use as space-division digital exchanges or time-division digital exchanges, which are PABXs;

(B) the equipment or systems do not have more than 512 ports;

(C) the equipment or systems do not support any form of Integrated Services Digital Networks;

(D) the equipment or systems do not contain digital computers or related equipment specified in head (f) of entry IL1565 in this Group or in paragraphs (a) to (j) inclusive or paragraph (m) of sub-head (h)(A) of entry IL1565;

(E) the PABXs do not have any of the following characteristics:

(a) multi-level call pre-emption (including overriding or seizing of busy subscriber lines, trunk circuits or switches) other than single-level call pre-emption (such as executive override);

(b) common channel signalling;

(c) dynamic adaptive routing;

(d) digital synchronisation circuitry which uses equipment specified in head (d) of entry IL1529 in Group 3F;

(f) centralised network control which is:

(A) based on network management protocol; and

(B) capable of receiving data from the nodes and processing such data to control traffic and directionalise paths;

(F) any communication channels or terminal devices used for administrative and control purposes:

(a) can only be used for those purposes; and

(b) do not exceed 9,600 bit/s;

(G) the software supplied -

(a) is limited to the minimum specially designed operating systems, diagnostic systems, maintenance systems or application software necessary for the installation, operation and maintenance of the equipment or systems and is in machine-executable form;

(b) does not include software:

- (1) specified in entry IL1527 in Group 3F, or in sub-head (a)(5) in entry IL1566 in this Group or in entry ML11 in Group 1, or
- (2) that permits user-modification of generic software or its associated documentation; and
- (H) the equipment or systems are designed for installation by the user without support from the supplier;
- (c) Technology applicable to the development, production, installation, operation or maintenance of stored-programme-controlled, communication switching equipment or systems (including equipment or systems referred to in the exceptions to heads (a) and (b) above, if the technology exceeds the minimum technical information necessary for the installation, operation and maintenance of such equipment or systems).....D

In this entry -

“affiliated equipment” means the following equipment:

- (a) input/output (I/O) control units;
- (b) recording or reproducing equipment;
- (c) displays; or
- (d) other peripheral equipment;

“common channel signalling” means a signalling method in which a single channel between exchanges conveys, by means of labelled messages, signalling information relating to a multiplicity of circuits or calls and other information such as that used for network management;

“communication channel” means the transmission path or circuit including the terminating transmission and receiving equipment (modems) for transferring digital information between distant locations;

“data device” means equipment capable of transmitting or receiving sequences of digital information;

“data (message) switching” means a technique, including store-and-forward or packet switching, for:

- (a) accepting data groups (including messages, packets or other digital or telegraphic information groups which are transmitted as a composite whole);
- (b) storing (buffering) data groups as necessary;
- (c) processing part or all of the data groups, as necessary, for the purpose of:
 - (1) control (routing, priority, forming, code conversion, error control, retransmission or journaling);
 - (2) transmission; or
 - (3) multiplexing; and
- (d) retransmitting processed data groups when transmission or receiving facilities are available;

“data-signalling rate” means the maximum rate in either transmission or reception, taking into account that, for non-binary modulation, baud and bit per second are not equal; (binary digits for coding, checking, and synchronization functions are included);

“digital computer” means equipment which can, in the form of one or more discrete variables:

- (a) accept data;
- (b) store data or instructions in fixed or alterable storage devices;

(c) process data by means of a stored sequence of instructions which is modifiable; and

(d) provide output of data;

“fast select” means a facility applicable to virtual calls, which allows data terminal equipment to expand the possibility of transmitting data in call set-up and clearing packets beyond the basic capabilities of a virtual call;

“local area network” means a data communication system which:

(a) allows any number of independent data devices to communicate directly with each other; and

(b) is confined to a geographical area of moderate size (such as an office building, a plant, a campus, or a warehouse);

“PABX” (private automatic branch exchange) means an automatic telephone exchange (whether or not incorporating a position for an attendant), designed to provide access to the public network and serving extensions within an institution;

“packet” means a group of binary digits (including call control signals and data) which is switched as a composite whole, the call control signals, data and (if present) error control information being arranged in a specified format;

“packet-mode operation” means the transmission of data by means of addressed packets, whereby a transmission channel is occupied for the duration of the packet only and the channel is then available for use by packets being transferred between different data terminal equipments; (in certain data communication networks the data may be formatted into a packet or divided and then formatted into a number of packets, either by the data terminal equipment or by equipment within the network, for transmission and multiplexing purposes);

“space-division analogue exchange” means a space-division exchange, which uses an analogue (including sampled analogue) signal within the switching matrix, and which can route digital signals, subject to the bandwidth limitations of the equipment; (such exchanges in public networks commonly pass digital data rates of several kilobit per second per voice channel of 3,100 Hz);

“space-division digital exchange” means a space-division exchange, which accommodates the transmission through the switching matrix of digital signals requiring a bandwidth wider than a voice channel of 3,100 Hz;

“space-division exchange” means an exchange in which different streams of data or voice signals are routed through the switching matrix along physically different paths; (the signal being routed through the matrix may be analogue - such as conventional amplitude-modulation or pulse amplitude-modulation - or digital - such as pulse code modulation, delta modulations or data);

“stored-programme-controlled circuit switching” means a technique

(a) for establishing, on demand and until released, a direct (space-division switching) or logical (time-division switching) connection between circuits, and

(b) which is based on switching control information derived from any source or circuit and processed according to the stored programme by one or more electronic computers;

“stored-programme-controlled telegraph circuit switching” means techniques essentially identical to those for stored-programme-controlled telephone circuit switching, for establishing

connections between telegraph (for example telex) circuits based solely on a subscriber type of signalling information;

“stored-programme-controlled telephone circuit switching” means a technique

- (a) or establishing within an exchange, on demand and until released, an exclusive direct (space-division switching) or logical (time-division switching) connection between calling and called telephone circuits;
- (b) based solely on a subscriber type of telephone signalling information derived from the calling circuit; and
- (c) processed according to the stored programmes by one or more electronic computers;

for this purpose the telephone circuits may carry any type of signal (including telephone or telex), comparable with a voice channel bandwidth of 3,100 Hz or less;

“terminal device” means a data device which:

- (a) does not include process control sensing and actuating devices; and
- (b) is capable of:
 - (1) accepting or producing a physical record;
 - (2) accepting a manual input; or
 - (3) producing a visual output;

for the purpose of this definition a combination of such equipment (such as a combination of printer and paper tape punch or reader) which is connected to a single data channel or communications channel, constitutes a single terminal device;

“terminal exchange” means an exchange which performs the function of one or more of the following -

- (a) a local exchange used for terminating subscribers' lines;
- (b) a remote switching unit which performs some functions of a local exchange and operates under a measure of control from the parent exchange; or
- (c) a local exchange which is used as a switching point for traffic between subordinate local exchanges (and which is generally 2-wire but may also provide 4-wire connections to and from the national long-distance network);

“time-division analogue exchange” means a time-division exchange in which the parameter associated with an individual segment of a stream of data or voice signals varies continuously;

“time-division digital exchange” means a time-division exchange in which the parameter associated with an individual segment of a stream of data or voice signals is one of the finite number of digitally coded values;

“time-division exchange” means an exchange in which segments of different streams of data or voice are interleaved in time and routed through the switching matrix along a common physical path; (the matrix may also include one or more stages of space-division switching; and the signal being routed through the matrix may be analogue (such as pulse amplitude modulation) or digital (such as pulse code modulation, delta modulation or data);

“total data signalling rate” means the sum of the individual data signalling rates of all communication channels which have been provided with the system and can be sustained simultaneously, assuming a configuration of equipment that would maximize this sum of rates;

“transit exchange” means an exchange that performs the function of a terminal exchange or one or both of the following:

- (a) a switching point for traffic between other exchanges in the national network (otherwise known as a “trunk exchange” and generally 4-wire); or
- (b) a 4-wire exchange serving outgoing, incoming or transit international calls;

“trunk circuit” means a circuit with associated equipment terminating in two exchanges.

Any term used in this entry shall bear the same meaning it has in entry IL1565 and entry IL1566 in this Group.”;

- (i) in Group 3I of Part II of Schedule 1, for entry PL7007 there shall be substituted the following entry:

“PL7007 Chemicals, the following -

- (a) 2-chloroethanol W,L,I,Y
- (b) 3-quinuclidinyl W,L,I,Y
- (c) Di-isopropylamine..... W,L,I,Y
- (d) Dimethylamine W,L,I,Y
- (e) Dimethylamine hydrochloride..... W,L,I,Y
- (f) Dimethyl methylphosphate W,L,I,Y
- (g) Dimethylphosphite W,L,I,Y
- (h) Hydrogen fluoride L,I,Y
- (i) Methyl benzilate..... W,L,I,Y
- (j) Methyl phosphonyl dichloride W,L,I,Y
- (k) Methyl phosphonyl difluoride W,L,I,Y
- (l) 0-Ethyl-2-Di-isopropylaminoethyl methylphosphonite W,L,I,Y
- (m) Pinacolyl alcohol..... W,L,I,Y
- (n) Pinacolone (3,3-Dimethyl-2-butanone) W,L,I,Y
- (o) Phosphorus oxychloride W,L,I,Y
- (p) Phosphorus pentasulphide W,L,I,Y
- (q) Phosphorus trichloride..... W,L,I,Y
- (r) Potassium fluoride W,L,I,Y
- (s) Thiodiglycol W,L,I,Y
- (t) Thionyl chloride..... W,L,I,Y
- (u) Trimethyl phosphite..... W,L,I,Y
- (v) Tri-ethanolamine..... W,L,I,Y”.

1st August 1990.

Michael Coolican
An Assistant Secretary,
Department of Trade and Industry.

**SCHEDULE
ENTRIES DELETED**

IL1075
IL1093
IL1129
IL1203
IL1206
IL1305
IL1354
IL1356
IL1359
IL1360
IL1365
IL1372
IL1399
IL1425
IL1514
IL1521
IL1532
IL1541
IL1542
IL1544
IL1545
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IL1584
IL1587
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IL1635
IL1734
IL1749
IL1760

EXPLANATORY NOTE

(This note is not part of the Order)

This Order further amends the Export of Goods (Control) Order 1989 ("the Order").

Export control is:

- (a) lifted on: certain silver coin; spin forming and flow forming machines; vacuum pump systems; cryopump systems; consumable electrode vacuum arc furnaces; skull type vacuum arc furnaces; vacuum induction furnaces; induction furnaces; electric arc devices, plasma torches and equipment; metal rolling mills including isothermal rolling mills; equipment for the manufacture and testing of printed circuit boards; equipment for the continuous coating of polyester-base magnetic tape; tooling and fixtures for the manufacture of fibre-optic connectors and couplers; equipment for automatic X-ray orientation and angle correction of quartz crystals; equipment for in-service monitoring of acoustic emissions in airborne vehicles or underwater vehicles; technology for industrial gas turbine engines; floating docks; pulse modulators; panoramic radio receivers; solid state amplifiers; digitally controlled radio receivers incorporating frequency synthesisers; cathode ray tubes; cold cathode tubes and switches; semiconductor diodes; transistors; thyristors; hydrogen and hydrogen isotope thyratrons of ceramic-metal construction; thermoelectric materials and devices; oscilloscopes, waveform recorders, waveform digitisers, transient recorders and associated plug-in modules; quartz crystals and assemblies thereof; materials composed of crystals having special structures; thin film devices; steel alloys; low density rigid, carbon-bonded, fibrous or non-fibrous carbon thermal insulating materials; polycarbonate sheet; tantalates and niobates;
- (b) lifted in respect of the export of goods indicated by "Z" to Namibia. Moreover the blanket control of exports to Namibia of all specialized components for goods specified in Group 1 of Part II of Schedule 1 to the Order is lifted, though the export of many such components to Namibia remains controlled by virtue of other provisions of the Order;
- (c) reduced in scope on: computer numerically controlled units for machine tools and dimensional inspection machines; computer numerically controlled milling machines, turning machines, grinding machines and other machine tools; components and parts for machine tools; dimensional inspection machines; optical fibre testing equipment; robots, robot controllers and end effectors; digitally controlled radio receivers; telecommunication transmission equipment employing digital techniques; microwave radio links; ground communication radio equipment; civil sound or television broadcast receiving stations; equipment for the transmission of television signals; equipment for satellite earth stations; tropospheric scatter communication equipment; radio transmitters using frequency synthesis; microwave equipment; personal computer systems, minicomputers and related equipment including disk drives, tape drives, monitors and local area networks; computers used as an essential part of other systems; computers used in medical systems; computer technology; operating systems; commercially available software; software for the networking of computers; private automatic branch exchanges; telex and international civil aviation data (message) switch systems;
- (d) redefined or clarified in relation to ODMA software, and on: technology for computer numerically controlled units and machine tools; software for flexible manufacturing systems; precision linear and angular measuring machines; machine tools for generating optical quality surfaces; technology for the development or production of telecommunications transmission equipment employing digital transmission techniques; software for computer aided design of integrated circuits; software for flexible manufacturing systems;
- (e) extended in scope on: telecommunication transmission equipment; chemical weapon precursors.

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