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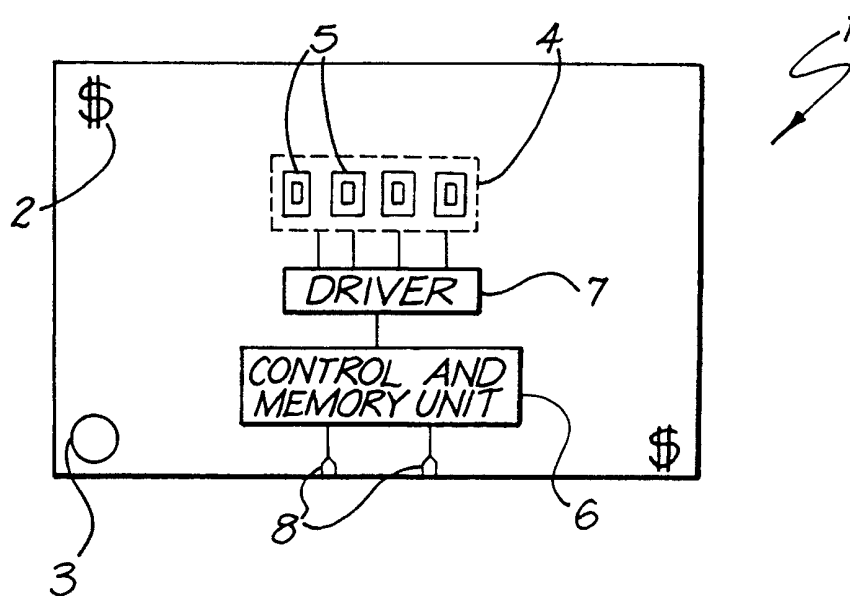
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **BANKCARD OR NOTE WITH DISPLAY**



(57) **Abstract:** The present invention relates to currency. Currency is usually provided by a plurality of coins or notes having given, fixed denominations. The present invention provides a form of currency which comprises a card or note having an indication means for indicating a currency value, the indication means being variable, so that the card or note can represent different currency denominations. The indication means is preferably in the form of a display, and the card or note means for altering the display in response to a currency transaction.



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BANKCARD OR NOTE WITH DISPLAY

The present invention relates generally to monetary currency and particularly, but not exclusively, to a bank note or card which may be arranged to be of variable
5 monetary value.

Currency is generally provided in the form of bank notes and coins having predetermined denominations. For example, Australian bank notes are in denominations of \$5, \$10, \$20, \$50 and \$100. The production of notes for so
10 many denominations is complex and expensive, particularly because each note has to incorporate security measures to avoid forgery as well as measures to distinguish the denomination.

Further, currency in this form is only "cashed" by
15 exchange transactions, ie. notes must be exchanged in return for goods or services. It is, therefore, necessary to produce notes in different denominations in high numbers to ensure there is enough cash in the economy to facilitate the exchange of goods and services.

20 Credit cards and "smart" cards are available which can be used in place of cash, for all transactions for goods and services where means (usually a terminal) are provided in relation to the credit card or "smart" card which enable a goods/service provider to enter the
25 transaction. For a credit card, a payment transaction terminal is usually required. A transaction terminal may be able to access an account on line, and maybe at least able to communicate messages to a transaction acquirer so that a transaction can be processed. Some smart cards
30 carry a "certified" currency amount in memory which is decremented in response to a transaction. There is no visual indication provided on either a credit card or a "smart" card, however, indicating an actual credit value of the card. To check the credit either the credit memory
35 of the card (smart card) or the account of the card owner must be accessed and this requires a device which can access the credit memory (smart card) and ascertain an amount of available credit, or requires a communication

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link with an account provider (bank). The device which can access the credit memory (smart card) or the communication device (usually a computer terminal) must have a display or printer which can provide an indication of the amount in the credit memory or the amount available on the credit card account.

A prepaid card which has a display which shows an amount of units of value remaining on the prepaid card is disclosed in Japanese Patent Application 63-282978 (NEC Corporation). A series of numerals are provided on the card (e.g. numerals 1 through 10). A card reader reads the remaining value on the card from a magnetic stripe memory and causes embossed projections to be made against the numeral indicating the remainder value of units. This primitive "display" cannot be re-used once the embossing has been inserted and requires an external device to read the remainder amount from the magnetic stripe, and also to cause the embossing to occur.

From a first aspect, the present invention provides a card or note including a display having indication means arranged to indicate a currency value and means enabling variation of the indication means to indicate a new currency value.

The means enabling variation of the indication means is preferably arranged to vary the indication means in response to a transaction, to indicate a new currency value.

Preferably, the display is fully mutable. That is it is able to display any variation of the currency value required. It is also able to display any graphical form which may be required e.g. numerals, letters (i.e. in a similar manner to a conventional computer display or CCD display).

Preferably, the display is both incrementable and decrementable, to show a higher or lower currency value.

Preferably, the card or note includes a processor. The processor may implement the means enabling variation of the indication means and therefore may control the

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currency value displayed. Preferably, the processor also includes means enabling authentication of the amount displayed. This may include a security means, such as a stored encrypted security code, which can be accessed by a device to confirm that the value being displayed is in fact an authorised value.

Preferably, the display is a permanent display. That is, a currency value generally remains displayed until the display is changed to indicate a new currency value. Preferably, the display does not require any power supply to maintain the display of the currency value.

In one embodiment, the card or note is arranged to be accessed by a payment terminal device, which affects the variation enabling means to cause the indication means to indicate a new currency value. The payment terminal device may be operated to carry out a transaction and, for example, may operate to credit a provider of goods/services in accordance with the currency value for the transaction. For example, a retail store could operate payment terminal devices which would access the card or note in accordance with a transaction and cause the value indicated on the card or note to vary depending upon the value of the transaction.

The card or note may include a memory which is arranged to store a currency value. The payment terminal device is preferably arranged to decrement or increment the value in the memory in accordance with the transaction. The stored value may be the same as the displayed value but in an alternative embodiment the stored value may be different from the displayed value. For example, an owner of the note or card may not wish the full value of credit to be displayed, for security purposes, and may wish a lower value to be displayed than actually is stored on the card. In such a case, the display would preferably not be decremented until the stored value fell below the displayed value, but the value on the display would provide an indication to the service/goods provider that there was sufficient credit

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for the transaction.

In an alternative embodiment credit may not be stored in a memory of the card or note but the payment terminal device may be arranged to access a users account at an
5 account acquirer location (bank). Variation of the amount in the users account in accordance with the transaction is reflected in variation in the displayed amount on the card or note. The display thus reflects the value of a users account. Again, the display may not show the same value
10 as that of the users account, but may, for example, be of lower value and will, therefore, only vary when the users account drops below the displayed value.

The value displayed on the note or card may also be incremented. For example, at intervals the credit value
15 of the note or card may require replenishing. Then if appropriate credit is allocated by the user (via an account or via other means, eg. "buying" more credit) the display will be incremented to reflect the increased credit.

20 The display may be a display which can be varied magnetically or optically to vary the indicators. The power supply may only be required when variation of the display is required and, therefore, may be provided via a payment terminal device. No permanent power supply on the
25 note or card is therefore required in such a case.

The terms "card" or "note" could also include other portable items, such as disks, or any item of relatively small, portable nature. Preferably, however, the card or note is a credit-type card, or a note similar to presently
30 available currency notes.

Providing a card or note which displays a currency value obviates the need for a plurality of currency notes of different denominations. One note or card can have many denominations, of any desirable increment.

35 The card or note may incorporate a memory including a plurality of locations for currency values. One location may be representative of the amount of a value being displayed while another location is representative of an

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amount of credit which is available to the user but which is not displayed. Preferably, currency value can be transferred from the "reserve" memory location to the memory location which drives the display. More than one
5 memory device may also be included in the card or note. A value for cash in the memory which drives the display may be replenished from the currency stored in the other memory. Means may be provided to access the other memory and drive the display to indicate how much currency is
10 stored in the reserve memory.

A note or card such as this may be used in the standard way that the present standard currency is used. That is, it may be handed from one person to another and taken by the person it is being handed to as having the
15 value that is indicated on the indication means. The person may have a reader for reading a stored verification of authority of the currency confirming that the currency is authorised. Alternatively, a visual indication, such as a visible sign, or part of the indication means, may
20 indicate that the currency is authorised visibly, so that no reader is required.

The note or card in accordance with the present invention may be used as standard currency, therefore, to be exchanged between people. A bank, or other financial
25 institution, for example, may have a plurality of these notes or cards and may assign a different value to each of the plurality. Security authorisation means in a processor in a note or card may only allow access by authorised representatives of the bank or financial
30 institution. That is, the display cannot be altered by an unauthorised persons, such as members of the public. The note or card will therefore be used as general currency in exchange between persons. When returned to the bank or financial institution, the display may be changed as
35 required by the bank or financial institution. This has the advantage that only one type of note or card needs to be produced for a bank or financial institution to represent many values of currency.

Alternatively, a note or card may be "owned" by an individual, and used to display various currency values depending on the state of an account of the individual, as discussed above.

5 In a further aspect, the present invention provides a currency note or card which is arranged to be representative of various currency values and includes a display having indicator means for indicating various
10 currency values and also includes means for varying the displayed value.

 As discussed above, the note or card may include a verification of authority means which verifies (e.g. to the public) that the note or card is authorised at the displayed value by e.g. a financial institution. The
15 verification of authority means may be visible (e.g. watermark, part of the changeable display) or stored in memory (e.g. a security code which can be checked by an appropriate reading device).

 The note or card preferably also includes a security
20 authorisation means, such as a security code, for example, which only enables access to vary the display if the security code is provided. The security authorisation means may only be enabled by preselected entities, e.g. authorised representatives of a financial institution.

25 From yet a further aspect, the present invention provides a payment terminal including means arranged to cause variation of a display of a card or note as discussed above, in response to a transaction.

 From yet a further aspect, the present invention
30 provides a computer readable medium, storing instructions for controlling a payment terminal to provide a means arranged to cause variation of the display of a card or note.

 From yet a further aspect, the present invention
35 provides a method of providing currency, comprising the steps of providing a note or card including a variable display, and setting the display to a predetermined currency value, and providing the note or card to the

public for use in commerce.

Features and advantages of the present invention will become apparent from the following description of an embodiment thereof, by way of example only, with reference
5 to the accompanying drawings, in which:

Figure 1 is a schematic diagram of a card or note in accordance with an embodiment of the present invention, and

Figure 2 is a diagram of an example payment terminal
10 for use in varying the display of the note or card of Figure 1.

Reference numeral 1 generally indicates a note or card. It may be a relatively flexible item (resembling a bank note) or it may be a relatively rigid item
15 (resembling a credit card). The note or card 1 may include various printed symbols 2,3 as with conventional credit cards or notes. Some of the symbols may be for security purposes, for example.

The card or note 1 also includes a display 4 having
20 indicator means 5 which are variable and arranged to indicate a currency value. The display 4 is incrementable and decrementable (to show increased values and decreased values). It is also fully mutable, so that it may display any graphical symbol e.g. letters, numbers, etc, depending
25 upon programming. Means for varying the display includes a processor having control unit and memory 6 and display driver 7. The display 4 is preferably of a type which remains even when there is no power supply. For example, the indicator means may be altered by magnetic means and
30 the driver 7 be arranged to alter the orientation of the magnetic means to alter the value displayed. Power is only required when the display is being altered and, therefore, may be taken from an external source, such as the terminal of Figure 2. In an alternative embodiment,
35 the display may be a standard LCD display, in which case it would require a power supply to remain permanent.

The display may be a liquid polymer display.

The memory 6 is arranged to store a credit value

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which may be reflected by the value displayed by indicators 5. The credit value and the display can be incremented and decremented in response to a transaction, via connectors 8.

5 Figure 2 illustrates a payment terminal device 10 for use with the card or note 1. The payment terminal device may be used by a goods/services provider to vary the credit available on the note 1 in response to a transaction.

10 The terminal 10 comprises a connector arrangement 11 arranged to connect to the connectors 8 of the note 1, so that a transaction can be carried out. It also comprises a keypad 12, including a decimal set of keys and control keys whereby transaction information and values can be
15 entered. The terminal also comprises a display 13 for displaying desired transaction information. Such a payment terminal may be based on know EFTPOS terminals or terminals which are used for "smart" card transactions, with any modifications which may be required to cause the
20 display 4 on the note 1 to be altered in accordance with a transaction. The connector 11 will be arranged to be compatible with whatever type of connectors 8 are used.

 The device 10 is also provided with a communication line 13 which may be arranged to enable communication with
25 an account acquirer such as a bank. Note that in one embodiment, software on the EFT terminal may be included to drive the controller memory unit 6 to cause the driver 7 to change the display 4. Preferably, however, the EFT terminal merely acts as a communications terminal
30 communicating the value to the controller memory unit 8 (i.e. an updated value) depending on a transaction occurring via the EFT terminal. When the memory has been updated, the processor 6 and driver 7 will cause the display to be updated.

35 In operation, a card owner who wishes to buy goods or services presents the card or note 1 to a terminal 10 operator. The display 4 would indicate a value sufficient to deal with the transaction. Both the terminal operator

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and card/note owner would therefore have confidence that there was enough credit to deal with the transaction without it being necessary for them to go through the (possibly embarrassing) operation of operating the terminal 10 to access the card 1. Indeed, the card owner 5 1 is unlikely to engage in the transaction in the first place if the value indicated by indicators 5 is insufficient.

The terminal operator engages the connectors 8 with the connector 11 on the terminal 10 and operates the keypad 12 to enter the relevant transaction information, including the credit value of the transaction. In response to the information from the unit 10, the control unit 6 decrements the credit value in the memory and at 15 the same time causes the driver 7 to operate the indicators 5 to decrement the indicated value accordingly.

A memory storing actual credit units need not be included on the card or note 1. In an alternative embodiment, security and account information is included 20 on the card 1 to enable the terminal 10 to access the users account via communications line 13. The account is decremented accordingly and the amount in the account is reflected by the display 4. The only difference in operation between this variation and EFTPOS, is that means 25 needs to be provided to ensure that the display is updated. This means includes the controller memory unit 6 and driver 7.

In a further alternative embodiment, indication means 5 may be optically or magnetically altered by suitable magnetic or optical actuating means incorporated in the terminal device 10. That is the driver 7 may be dispensed with and the character altering instead be driven from the device 10, by suitable optical or magnetic means. 30

The card or note 1 could include a simple memory, rather than an integrated circuit, in the form of a magnetic strip, for example. For example, the magnetic strip may include information enabling a terminal 10 to access the users account. The display 4 would be changed 35

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in accordance with the transaction once the account had been accessed. The display may be changed by appropriate means in the terminal 10 or by a driver 7 in the card or note. Such an arrangement would resemble magnetic striped 5 cards presently used with EFTPOS with the addition of a variable display indicating an amount available for credit. The terminal 10 may include appropriate software to control the display 5 directly.

In yet a further alternative embodiment, a security 10 authorisation means is provided for ensuring that the display is not changed without the appropriate authorisation. If the card or note is provided with the appropriate authorisation, the display may be varied. This embodiment may be used as general currency with, as 15 far as the public using the currency are concerned, a fixed value, which can only be changed by the person authorised to change the value (e.g. a financial institution).

The card or note may also include a verification of 20 authority means. The verification of authority means may include, for example, a stored encrypted value which can be detected for authorisation by an appropriate reader. Further, the security authorisation means may include a visible mark (e.g. watermark) or indication on the display 25 that the card or note has the appropriate authorisation. The encryption code or authority may be issued by an authorising body, such as a financial institution, such as a bank.

Financial institutions may therefore issue currency 30 in this form (i.e. card or note with variable display). The financial institutions may only allow access to change the display by authorised representatives of the financial institution (i.e. bank branches). The note may include a visible indication (i.e. watermark, or variable part of 35 the display again only with access allowed by the bank) that the value displayed is authorised by the financial institution. The card or note may therefore be used as general currency and physically exchanged between people,

who can be satisfied that the value displayed is not a forgery, because they have authorisation (either visible or relying on the electronic authorisation-encrypted code- which may be stored in a memory on the card, by the
5 financial institution).

The financial institution may at any time change the value of the display when they have access to the card or note (using an appropriate reader/writer). There is therefore the possibility that a single type of card or
10 note may be produced for the financial institution, for representing various currency amounts.

The card or note may alternatively belong to an individual, and the variable display represents an amount of currency which the individual has on that particular
15 card or note, and it may be changeable depending on transactions, as discussed above.

In a further alternative embodiment, the recently developed "electronic paper" may be used to provide the display for the card or note.

20 In the above embodiment, connections are provided to allow access to the processor on the card or note. Connections need not be provided. Communications may be by wireless means.

Variations and modifications may be made in respect
25 of the invention as above described and defined in the following statements of claims.

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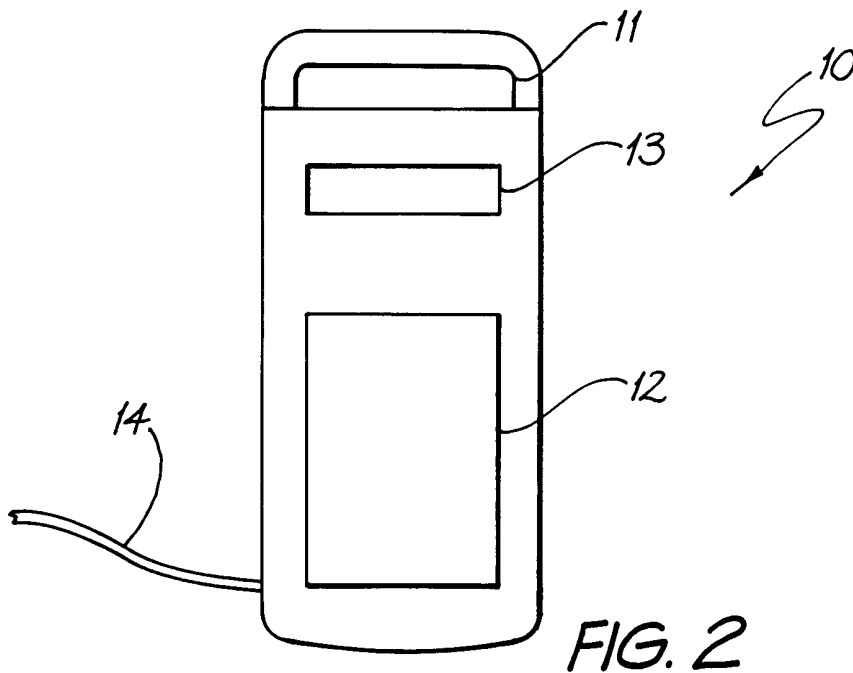
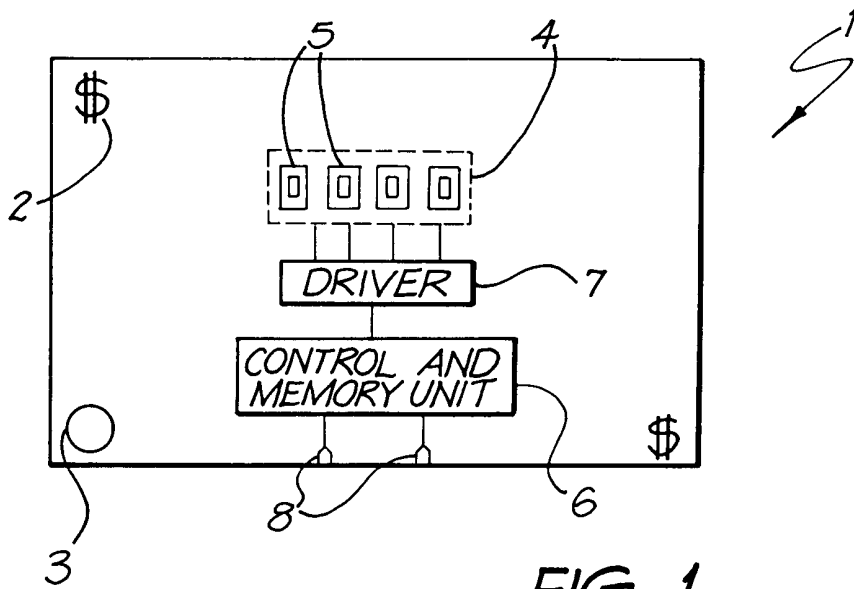
CLAIMS:

1. A card or note including a display having indication means arranged to indicate a currency value and means enabling variation of the indication means to indicate a new currency value.
5
2. A card or a note in accordance with claim 1, wherein the display is fully mutable.
3. A card or note in accordance with claim 1 or claim 2, wherein the display is incrementable and
10 decrementable.
4. A card or note in accordance with any one of claims 1, 2 or 3, the display being arranged so that the value is permanently displayed.
5. A card or note in accordance with claim 4 wherein the
15 variable permanent display does not require a power supply to maintain it.
6. A card or note in accordance with any one of the preceding claims, wherein the variation enabling means is arranged to automatically vary the
20 indication means in response to a transaction.
7. A card in accordance with any one of the preceding claims, the card being a "smart" card.
8. A card or note in accordance with any one of the preceding claims, including a memory storing a
25 currency value.
9. A card or note in accordance with claim 8 wherein the card is arranged to display a different value than that stored in memory.
10. A card or note in accordance with any one of the
30 preceding claims, the card or note including security authorisation means preventing variation of the display unless the correct security information is provided.
11. A card or note in accordance with claim 10, including
35 a verification of authority means authorising that the display is correct.
12. A card or note in accordance with claim 11, wherein the verification of authority means is visible.

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13. A currency note which is arranged to be representative of various currency values and includes a display having indicator means for indicating various currency values and also includes means for varying the display value.
14. A currency note in accordance with claim 13, the currency note including security authorisation means preventing changing of the display of the currency note or card without appropriate authorisation.
15. A currency note or card in accordance with claim 13 or claim 14, further including a verification of authority means arranged to verify that the display value is correct.
16. A terminal including means arranged to cause a variation of the display of a card or note in accordance with any one of the preceding claims.
17. A computer readable medium, storing instructions for controlling a terminal to provide a means arranged to cause variation of the display of a card or note according to any one of claims 1 to 15.
18. A method of providing currency, comprising the steps of providing a note or card including a variable display, and setting the display to a predetermined currency value, and providing the note or card to the public for use in commerce.
19. A method in accordance with claim 18, including the steps of providing a plurality of the notes or cards and setting the plurality to display different currency values.
20. A method in accordance with claim 18 or claim 19, wherein the note or card includes a security authorisation means, and the method comprising the step of preventing the display being varied unless security authorisation is provided.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/00835

A. CLASSIFICATION OF SUBJECT MATTER																	
Int. Cl. ⁷ : G06K 19/067, 19/07, B42D 15/10, 109:00																	
According to International Patent Classification (IPC) or to both national classification and IPC																	
B. FIELDS SEARCHED																	
Minimum documentation searched (classification system followed by classification symbols) IPC : G06K 19/067, 19/07, B42D 15/10, 109:00																	
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : IPC AS ABOVE																	
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT, USPTO Web Patent Database, Esp@cenet , "smart card, prepaid, balance etc"																	
C. DOCUMENTS CONSIDERED TO BE RELEVANT																	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.															
X	US, A, 5122643 (GAMOU et al.) 16 June 1992 Whole document.	1-20															
X	AU, A, 61127/94 (LANDIS & GYR ENERGY MANAGEMENT (UK) LTD) 26 September 1994. Whole document.	1-8,10-20															
X	US, A, 5055662 (HASEGAWA) 8 October 1991 Whole document.	1-8,16-19															
X	GB, A, 2067467 (BEAUMONT) 30 July 1981 Whole document.	1-4,6-8,10-20															
P,X	AU, A, 43530/99 (CITIBANK, N.A.) 16 March 2000 Whole document.	1-4,6-8,10-15,17-20															
<input type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex																	
* Special categories of cited documents: <table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td style="width: 10%;">"T"</td> <td>later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"X"</td> <td>document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y"</td> <td>document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E" earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O" document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention															
"E" earlier application or patent but published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone															
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art															
"O" document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family															
"P" document published prior to the international filing date but later than the priority date claimed																	
Date of the actual completion of the international search 19 September 2000		Date of mailing of the international search report 25 SEP 2000															
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929		Authorized officer P. THONG Telephone No : (02) 6283 2128															

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU00/00835

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
US	5122643	EP	242126	JP	62239286
AU	61127/94	GB	2275654	WO	9420929
US	5055662	EP	356723	JP	2693514
AU	43530/99	EP	980053	JP	2000200319

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