TAU

Aurora's Time & Attendance System

Operation Manual

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1.   Introduction

The $\mathcal{TAU}$ system is a Time and Attendance data collection system. It provides a complete solution to collecting the necessary information relating to the incoming and outgoing of personnel to and from their place of work. The system is optimized for firms that employ personnel on a temporary type basis, have personnel that are widely distributed, small offices and departments that employ a small number of employees in this capacity, typically 1-4 persons, and up to 15 persons per site (optionally, up to 30 personnel can be comfortably supported).

The $\mathcal{TAU}$ system consists of several components. These include:
1.   The $\mathcal{TAU}$ Unit.
2.   Smart cards, serving in several functionalities, including:
 2.1   The Employee's Personal Time Card.
 2.2   A Supervisor Card.
 2.3   An Accumulator Card.
 2.4   A System Setup Card.
3.   The Central Office Data Collection and Processing Center, based on a PC.

In general, the employees will clock in and out by inserting their Personal Cards into the Card Reader slot of the $\mathcal{TAU}$ Unit. The incoming and outgoing log will be written to both the Personal Card and to the $\mathcal{TAU}$ Unit memory. The entire operation is virtually immediate, and is as simple as "swiping" a magnetic card in a magnetic card reader.

The system can be configured to operate with either the Personal Card or the $\mathcal{TAU}$ Unit as the primary data carrier. In either case, the other element is the secondary data carrier and serves as a backup. The backup will retain its data in a closed, cyclic, loop.

1.1   Retaining the Transactions

As mentioned, the transactions are retained in both the Personal Cards of the employees and the $\mathcal{TAU}$ Unit.

A Personal Card can retain up to 121 transactions. If the Personal Card is the primary data carrier, it will have to be discharged of its data before the card memory is full. Typically, the Personal card will be discharged at least once a month. In this scenario, the $\mathcal{TAU}$ Unit will serve as a secondary or backup data memory. It will cycle the information in the Unit memory, so that, at any time (until it is discharged), the Unit will retain the last transactions that took place. The Unit memory retains 500 transactions, equivalent to over 4 man-months of typical activity. It can optionally be expanded to 18 or 36 man-months of data collection and retention. In its backup role, the Unit need not ever be discharged, as the

information is derived when the individual (Personal and Supervisor) cards are discharged of their information at the Data Collection Center.

If the 𝒯𝒜𝒰 Unit is the primary data carrier, it must be discharged of its data before its memory is full. The number of retained transactions is the same as described above. In this scenario, the Personal Card serves as a backup and does not need to be discharged. It will cycle the information, so that at any time, the Personal Card will retain the last 121 transactions recorded into it.

1.2   Discharging the Transactions

Discharging the transactions involves transferring the incoming and outgoing records of the employees from the primary data carrier to the Data Collection PC in the Data Collection Center.

Data can be discharged to a Data Collection Center in one of three methods:
(1) Discharging the 𝒯𝒜𝒰 Unit directly to the Data Collection PC.
(2) Discharging the 𝒯𝒜𝒰 Unit to an Accumulator Card on site. The Accumulator Card will then be sent to the Data Collection Center. There, it will be discharged to the Data Collection PC.
(3) Discharging the Employee Card to a Reader, connected to the Data Collection PC.

The outcome of a successful discharging session will involve, in all three cases, creation of (or adding to) a transaction file in the Data Collection PC and clearing the information in the primary data carrier.

1.2.1   Discharging the 𝒯𝒜𝒰 Unit to the Data Collection PC

If the 𝒯𝒜𝒰 Unit serves as the primary data carrier, it needs to be discharged before its memory becomes full.

In the case where the 𝒯𝒜𝒰 Unit data is discharged (downloaded) bi-weekly or weekly, the effective number of employees retained per 𝒯𝒜𝒰 Unit will be doubled or quadrupled. For example, a standard 𝒯𝒜𝒰 Unit, that can nominally retain 5 man-months of activity, will support 5 employees when discharged monthly, 10 employees when discharged bi-weekly and 20 employees when discharged weekly.

Discharging the 𝒯𝒜𝒰 Unit directly is carried out by connecting the Unit to the PC by means of a special Communications Cable. This cable is supplied with the software package that is to be installed in the PC. In order to implement the discharging procedure, the 𝒯𝒜𝒰 must be connected to the serial port of the PC. The Unit should then be activated in

the PC Control mode, and the $\mathcal{TAU}$ Processing program invoked in the Unit Discharge mode. The procedure is described in detail below.

1.2.2   Discharging the $\mathcal{TAU}$ Unit Through an Accumulator Card

In this mode of discharging the data, an Accumulator Card is inserted into the $\mathcal{TAU}$ Unit. The data in the Unit is discharged into the Accumulator Card. At this time, the data records are transferred to the Accumulator Card. If there are more transactions in the $\mathcal{TAU}$ Unit than can be stored in the memory of a single Accumulator Card, additional Accumulator Cards will be inserted and filled until all of the Unit transactions will have been transferred. At this time the $\mathcal{TAU}$ Unit memory will be cleared.

The Accumulator Card (or Cards) is, thereafter, sent to a Data Collection Center. There, the Cards will be inserted into either a $\mathcal{TAU}$ Unit or another Smart Card Reader.

At the Data Collection Center PC, the $\mathcal{TAU}$ Processing program is invoked in the Card Discharge mode. The procedure is described in detail below. It discharges the data from the Accumulator Cards into the PC, one at a time. The order of inserting the Accumulator Cards for discharging at the Data Collection Center is of no consequence. After each Accumulator Card is successfully discharged, it is cleared for reuse.

1.2.3   Discharging the Employee Card at the Data Collection Center

The third method of discharging transaction data to the Data Collection Center PC is by inserting the Employee Card into either a $\mathcal{TAU}$ Unit or another Smart Card Reader connected to that PC. This method of discharge is most commonly applied when the backup information in the Personal Card is called for.

This method of discharging is also used when the employee's Personal Card is the primary data carrier. In this situation, the $\mathcal{TAU}$ Unit serves only as a backup for the information on the cards of the employees served by that Unit. In this case, the memory in the Unit is written to in a cyclic manner and does not require periodic downloading. The employee Personal Card, however, must be discharged periodically. This will require every employee in the office to have his Personal Card presented at a Data Collection Center for data discharging.

At the Data Collection Center PC, the $\mathcal{TAU}$ Processing program is invoked in the Card Discharge mode. The procedure is described in detail below. It discharges the data from the Personal Card into the PC. After each Personal Card is successfully discharged, it is cleared.

The decision on which of the two methods of transferring logged data to the Data Collection Center is of major consequence, as the two methods are exclusive: any given office will have to decide whether the means of primary data storage are the Personal Cards or the $\mathcal{TAU}$ Units. This exclusivity is due to the different behavior between the primary and the backup data logging mediums. Thus, there can only be one backup data logger per office or per employee. Nevertheless, the Data Collection Centers can deal with both methods and are ambivalent as to which is selected.

In any case, regardless of which medium is selected as the primary data logger, the other medium will serve as a backup in case data from the primary logger is lost.

1.3   Supervisor Functions

The Supervisor Card will be issued to persons with the proper authority. It has two main functions:
1.   It will be required in order to set the time and date in the $\mathcal{TAU}$ Unit on site. Every time a Supervisory Card is used to perform the time and date correction, that information is stored both on the Supervisor Card and in the $\mathcal{TAU}$ Unit. This recorded information will thereafter be forwarded to the Central Office. This will discourage any tampering with the $\mathcal{TAU}$ Unit time settings by unauthorized persons.
2.   The Supervisor Card will also be used for entry confirmation of employees whose status requires this confirmation.

1.3.1   The Supervisory Confirmation Feature

When an Employee Card is issued, it is marked with a special Supervisory Confirmation Required status flag. This status flag determines whether the Employee can clock in without restriction, or whether he requires supervisory confirmation of his coming.

If the employee Personal Card requires supervisory confirmation, a supervisor must insert his Supervisor Card prior to insertion of the employee's Personal Card. Only then will the incoming transaction be registered.

2.   Card Types and Characteristics

The $\mathcal{TAU}$ System employs four functionally different memory cards. These are the Personal Card, the Supervisor Card, the Accumulator Card and the Setup Card. The Setup

Card is only used by authorized technical personnel, and will not be described in this document.

An Anti-tear functionality is implemented on all cards. This function provides protection and recovery from situations wherein the card was removed from the reader before the data update was completed. This situation is a potentially hazardous condition for the integrity of the information and calls for special handling techniques.
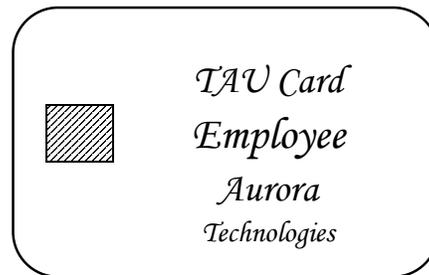
2.1   The Personal Card

The Personal Card is issued to each employee. It serves for employee identification as well as for retention of his clocking in and out data records. The Personal Card also retains several status flags that define the privileges and obligations of the employee.

The Personal Card is a 2,000 byte card. It can retain up to 121 transactions. The data on the card is divided into four distinct data groups. These are the Card Header, Employee Personal Data, Card Administration and Transaction Records. The Card Header and Employee Personal Data are initialized during card issuing, and are not modified during daily activation of the card.

The following are the main elements that are retained on the Personal Card:

2.1.1   Card Header

The Personal Card Header contains information characteristic of the card itself and of the application. This includes the application code, application version, card type, and card ID number.

The card ID number retains the personal ID number of the employee. It should be unique within the application system. The ID number can be up to 9 numeric digits long.

2.1.2   Employee Personal Data

This record contains:
- The Employee first and last names (up to 20 characters each).
- Card Issuing date.
- Card Expiration date.

2.1.3   Card Administration Information

This record includes:
- Card Status – active or inactive.

- The Personal Card Transaction Enumerator. Each transaction recorded on the card is associated with two numbers. These are the Card Transaction Enumerator and the Unit Transaction Enumerator. Their combination is unique to that particular transaction. The Personal Card Transaction Enumerator is incremented every time a clocking activity is registered.
- Personal Card Discharge Counter. This counter is incremented every time the Personal Card is discharged at a Discharging Station.
- Last Discharge Date.

2.1.4 Card Transaction Records

Each Transaction Record contains:
- The $\mathcal{TAU}$ Unit number associated with the activity.
- The Personal Card Transaction Enumerator.
- The $\mathcal{TAU}$ Unit Transaction Enumerator.
- The Supervisor Card number associated with the transaction. If no supervisory activity was required, this field is set to zero.

2.2 The Supervisor Card

The Supervisor Card is issued to employers and, possibly, to selected employees. It allows the holder to perform the specific tasks that require authorization. These include setting the time and date of the $\mathcal{TAU}$ Unit, confirming employee clocking in activities and accessing external computer services via the serial communications utilities of the Unit.

TAU Card
Supervisor
Aurora
Technologies
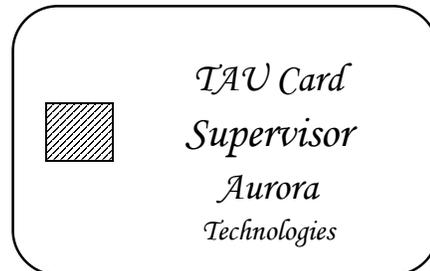
The Supervisor Card is a 2,000 byte card. It can retain up to 121 supervisor activity transactions. Supervisor activities that are recorded include setting the time and date of a $\mathcal{TAU}$ Unit.

Similar to the Personal Card, the data on the card is divided into four distinct data groups. These are the Card Header, Supervisor Personal Data, Card Administration and Transaction Records. The Card Header and Supervisor Personal Data are initialized during card issuing, and are not modified during daily activation of the card.
The following are the main elements that are retained on the Supervisor Card:

2.2.1 Card Administration Information

This record contains:
- Card Status – active or inactive.

- Supervisor Card Transaction Enumerator. Each transaction recorded on the card is associated with two numbers. These are the Card Transaction Enumerator and the Unit Transaction Enumerator. Their combination is unique to that particular transaction. The Supervisor Card Transaction Enumerator is incremented every time a supervisory activity is registered.
- Supervisor Card Discharge Counter. This counter is incremented every time the Supervisor Card is discharged at a Discharging Station.
- Last Discharge Date.

2.2.2   Card Transaction Records

Each Transaction Record contains:
- The *TAU* Unit number associated with the activity.
- Previous Time and Date.
- New Time and Date.
- The Supervisor Card Transaction Enumerator.
- The *TAU* Unit Transaction Enumerator.

2.3   The Accumulator Card

Accumulator Cards are issued per installed *TAU* Unit site. They serve as temporary media for remote (on site) discharging of the Unit contents. An Accumulator Card should be charged from only one *TAU* Unit, as it cannot retain transactions from more than one Unit at a time. Once the Accumulator Card has been discharged (and, therefore, cleared), it may be charged from any other Unit in the system.

TAU Card
Accumulator
Aurora
Technologies
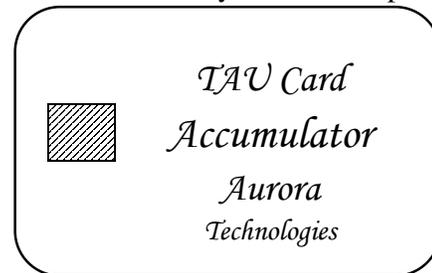
The Accumulator Card is an 8K Byte (8,192 bytes) card. It can retain up to 488 records. When a Unit is discharged into the Accumulator Card, both transaction and supervisory activity records are transferred.

The data on the Accumulator Card is divided into five distinct data groups. These are the Card Header, Accumulator Card Personality Data, Card Administration, Transaction Records and Activity Records. The Card Header and Accumulator Card Personality Data are initialized during card issuing, and are not modified during daily activation of the card. The following are the main elements that are retained on the Accumulator Card:

2.3.1   Card Header

The Accumulator Card Header contains information characteristic of the card itself and of the application. This includes the application code, application version, card type, and card ID number.

The card ID number retains the personal ID number of the Accumulator Card. It should be unique within the application system. The ID number can be up to 9 numerical digits long.

2.3.2 Accumulator Card Personality Data

This record contains:
- Card Issuing date.
- Card Expiration date.

2.3.3 Card Administration Information

These records contain:
- Accumulator Card Transaction Counter. This counter retains the number of transactions recorded on the card.
- Accumulator Card Transaction Discharge Counter. This counter is incremented every time the Accumulator Card transactions are discharged at a Discharging Station.
- Last Transaction Discharge Date.
- Discharged Unit number.
- Accumulator Card Activity Discharge Counter. This counter is incremented every time the Accumulator Card activities are discharged at a Discharging Station.
- Last Activity Discharge Date.

2.3.4 Card Transaction Records

Each Transaction Record is associated with an employee clocking in or out operation. It contains:
- Event description (date, time and IN or OUT event).
- The employee number.
- The Personal Card Transaction Enumerator.
- The $\mathcal{TAU}$ Unit Transaction Enumerator.
- The Supervisor Card number associated with the transaction. If no supervisory activity was required, this field is set to zero.

2.3.5 Card Activity Records

Each Activity Record is associated with a supervisor time and date update. It contains:
- The Supervisor Card number associated with the activity.
- Previous Date and Time.
- New Date and Time.
- The Supervisor Card Activity Enumerator.
- The $\mathcal{TAU}$ Unit Transaction Enumerator.

3.   Operating the $\mathcal{TAU}$ Unit

3.1   TAU Display

The Liquid Crystal Display (LCD) includes of 10 segmented characters and 12 Status Indicators. The characters can display numerical and some alphabetic characters. A typical display as shown in Figure 3.1.

```
IN                    M
21:27:38
```

Figure 3.1

The Status Indicators are shown in Fig. 3.2 and are explained below.

```
IN   BAT   SET   F1   M   B   OUT
88888888888
MEM   CARD   FULL   F2   NEXT
```
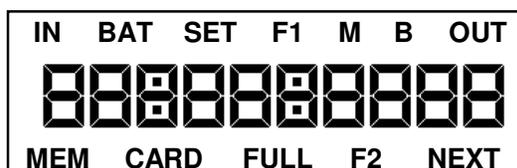
Figure 3.2

In its Normal mode of operation, the $\mathcal{TAU}$ Unit will alternately display the current time and date. The time is displayed in a 24 hour format and includes hours, minutes and second in hh:mm:ss format. Thus, the time of 32 minutes and 16 seconds after 1 PM will be displayed as 13:32:16. Date is displayed as day-month-year, dd-mm.yyyy format (e.g., 30-06-1992 represents the 30th day of June, 1992).

The indicators are turned on and off according to the mode of operation of the Unit.

3.1.1   The Display Indicators

3.1.1.1   IN and OUT Indicators

The IN Indicator is turned on when the Unit will record a clocking in operation. The OUT Indicator is turned on when the Unit will record a clocking out operation.   These two indicators are exclusive: at any given time, only one will be turned on. Changing the IN/OUT status of the Unit takes place when the corresponding IN or OUT key on the front panel is pressed.

3.1.1.2   BAT Indicator

The BAT Indicator will turn on if the batteries in the TAU Unit are low. The Unit will continue operating normally for up to two weeks in a low battery condition.

3.1.1.3   SET Indicator

The SET Indicator will turn on when the unit parameters are being set from the keypad. This occurs when the Unit time and date are being set (in the presence of a Supervisor Card), or when Unit internal parameters are undergoing modifications (in the presence of a Setup Card).

3.1.1.4   F1 and F2 Indicators

These are not currently in use.

3.1.1.5   M[ain] and B[ackup] Indicators

The M[ain] Indicator will be on when the Unit is activated as the main, or primary, data carrier. The B[ackup] Indicator will be on when the Unit is activated as the backup, or secondary, data carrier. As these two modes are exclusive, only one of these two indicators will be on during normal operation of the Unit.

3.1.1.6   MEM Indicator

The MEM Indicator will be on when the Unit is activated as the main, or primary, data carrier, and if the memory used in the Unit is above the the Memory Full Level. The Memory Full Level is a system parameter that can be set as part of the Unit Setup procedure.

3.1.1.7   CARD Indicator

The CARD Indicator will be on when a card (of any type) is inserted into the *TAU* Unit. When the card is removed, the CARD Indicator will turn off.

3.1.1.8   FULL Indicator

The FULL Indicator is associated with a Personal Card, inserted into the Unit. This indicator will be on if the Personal Card is the primary data carrier and if the card memory is full. In this situation, the operator will see the CARD FULL indicators on.

3.1.1.9   NEXT Indicator

The NEXT Indicator will only become active during the process of discharging a Unit into Accumulator cards. Once an Accumulator card is filled with data, and only if there are additional transactions in the Unit that need to be discharged, another Accumulator card is requested by the NEXT Indicator. When all of the transactions in the Unit have been discharged, the NEXT indicator will be turned off.

3.2   Using the TAU Unit Keys

The *TAU* Unit keys serve in two main functionalities. Normally, they allow changing the clocking mode of the Unit from IN to OUT. This functionality is active when the unit is in the Normal mode, and there is no card inserted into the card reader slot. In this mode, pressing the key will be augmented by an audible beep.

The keys double as data entry   Figure 3.3   nodes of operation that involve setting the unit up. In these modes, the OUT key doubles as an OK input and the IN (+) key as a value incrementing key.

When the Unit is in a mode that involves modifying a value, the current digit to be modified blinks on and off. Pressing the "+" key will increment the blinking digit. The digit value will cycle from its least value through to its maximum value, then repeat through that same sequence. Pressing the OK key will fix the last value in that digit, then transfer focus to the next relevant digit.

For example, when setting the Unit time and date, pressing the IN key will cause the digit that is currently being updated to increment. If the selected digit represents tens of minutes, it will cycle through the values 0, 1, 2, 3, 4, 5, then return to 0. Each pressing of th "+" key will increment the value in its cyclic sequence.

3.3   TAU Operating Modes

3.3.1   Normal Mode -- Clocking In and Out Using the 𝒯𝒜𝒰 Unit

In the Normal Mode, the Unit is prepared for insertion of a card. The Unit will display the current time and date, and the prevailing IN or OUT indicator will be shown.

Prior to inserting a card, the operator must first determine if the Unit is in the IN or in the OUT clocking mode.

If the Unit is in the correct clocking mode, then the Personal Card can be inserted into the card reader slot.

If the Unit is not in the correct clocking mode (i.e. the operator wishes to clock OUT whereas the Unit is in the clocking IN condition or vice versa), the correct IN or OUT key must be pressed before inserting the card. The corresponding IN or OUT Indicator will then turn on.

Once a Personal Card has been inserted, the display will show the card type ("P" for Personal) as shown in Figure 3.4. Also, the personal ID number of the card will be displayed (1234 in Figure 3.4). These will

```
 IN                    M

  P              1234
        CARD
```
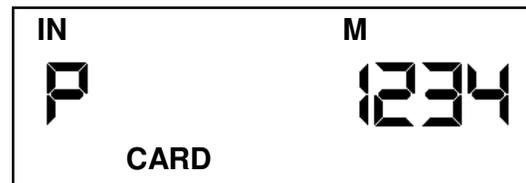
Figure 3.4

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remain displayed for as long as the card is inserted.

The clocking activity transaction will be retained in both the Unit and the Personal card. A single beep will sound when the clocking operation has been carried out successfully.

3.3.1.1   Responses to Unsuccessful Operations

If the clocking operation is not successful, two beeps will sound in succession. In this case, a relevant message will appear on the display. This message will either provide an error code, or a descriptive message. The error codes are described in the section on $\mathcal{TAU}$ error codes, below. They relate to problems associated with the Unit or the inserted card.

There are three descriptive messages that are situation related. These are:
(a)   "CALL SUPEr" – The Personal card requires Supervisor confirmation. This means that the Personal card inserted into the $\mathcal{TAU}$ Unit cannot clock in without having a Supervisor card inserted before the Personal card.
(b)   "Unit FULL" – The $\mathcal{TAU}$ Unit is the primary data retainer, and its memory is full. The Unit transactions must be discharged before any further transactions can be recorded into it. The current clocking operation was not carried out.
(c)   "CArd FULL" – The Personal card is the primary data retainer and its' memory is full. The transactions on the Personal card must be discharged before any further transactions can be recorded into it. The current clocking operation was not carried out.

3.3.2   Supervisor Modes
The Supervisor card serves three roles in the system operation.

3.3.2.1   Supervisor Confirmation
Personal Cards, that are marked as requiring a supervisory confirmation, must have the Supervisor card inserted into the $\mathcal{TAU}$ Unit before the Personal card is inserted for clocking in (clocking out does not involve supervisory confirmation). Inserting a Supervisor card will allow a single such Personal card to be clocked in, provided the Personal card is inserted within the timeout period configured into the Unit. The length of this timeout period is configured into the Unit as a configurable parameter.

To provide confirmation, the Supervisor card needs to be inserted, then extracted without any additional actions.

### 3.3.2.2   Setting a New Time and Date into the $\mathcal{TAU}$ Unit

The Supervisor card is inserted into the Unit, and the OK key is pressed. The Unit will now enter the Time and Date Setting Mode. The currently set date is displayed, and the leftmost digit will blink, indicating that that is the current digit selected to be set.

By pressing the "+" key, the digit is incremented, as described in the section on "Using the 𝒯𝒜𝒰 Unit Keys", above. Pressing the "OK" key will advance the selected digit to the next digit on the display. Once the date is completed, pressing "OK" will display the current time for setting.

Note: The Unit time and date may be set under PC Control through the communications channel.

3.3.2.3 Entering the Communications Mode

The Supervisor card is inserted into the Unit, and the IN key is pressed. The Unit will now enter the communications mode. The display will show "PC Control". The Unit will remain in communications mode until the OUT key is pressed or until the host computer commands the Unit to exit the communications mode.

```
IN                    M
PC ControL
```
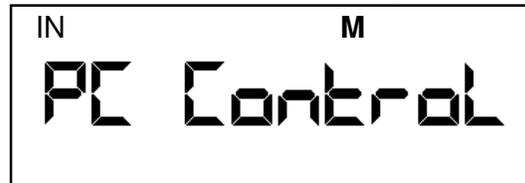
Note: Pressing the "IN" key 5 consecutive times will also cause the Unit to enter the communications mode.

3.4   Setting the Correct Time and Date from the Keyboard

In order to set the time and date, the following steps must be carried out:

1. A Supervisor Card must be inserted into the Unit. The display will show "S" (for Supervisor card), and the Supervisor card number (10008 in the shown example).

2. Press the "OK" key. The Unit will enter the Time and Date setting mode, and the current date will be displayed. The "SET" Display Indicator will turn on. The first (leftmost) digit will blink.
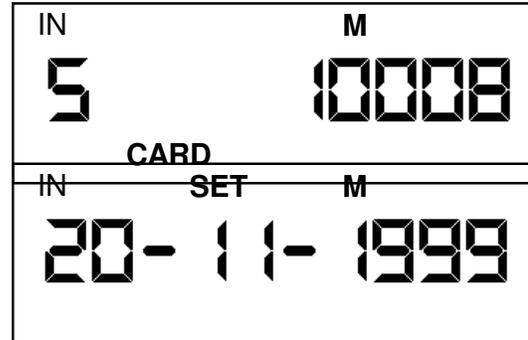
3. Repeatedly press the "+" key until the blinking digit represents the desired value. Then press the "OK" key. The next digit to the right will start blinking. If a digit is already correct, there is no need to increment it. Pressing the "OK" key will transfer focus to the next digit in line.

4. Repeat step 3 until all digits of the date have been entered. Removing the Supervisor Card at any time will cancel the operation and reestablish the Unit's former time and date settings.

5. Pressing "OK" after the date has been set will cause the current time to be displayed, and, again, the first (leftmost) digit will blink. Repeating steps 3 and 4 will allow setting the correct time.

6. When all the digits of the time have been set, pressing the "OK" key will cause the display to return to its normal time and date display. The time setting activity will be recorded in both the Unit and the Supervisor card.

3.5   Downloading Data to the Accumulator Card

The Accumulator Card is a means for discharging the $\mathcal{TAU}$ Unit on site, without necessitating any additional means of communication. In a downloading session, all events that were recorded in the Unit are discharged into the Accumulator Card. This includes both clocking activity records and time-setting activity records.

Downloading data to the Accumulator Card is carried out by inserting the Accumulator Card into the card slot. The Unit will display "A" followed by the number of the
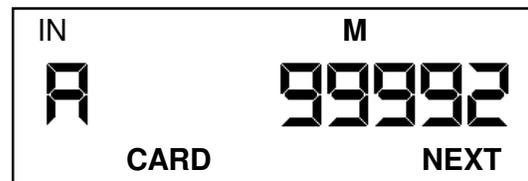
Accumulator Card (99992 in the shown example).

Pressing the "OK" key will activate the discharging sequence. Normally, the display will show the number of transactions retained in the Unit (on the left of the display, 1200 in the example), and a counter that continuously displays how many transactions have been discharged into the Accumulator Card (on the right of the display, 0123 in the example). This process will continue until either all transactions from the Unit will have been transferred to the Accumulator Card, or until the Accumulator Card becomes full.

```
IN                M
 0123 : 1200
```

If all the activity records were successfully downloaded to the Accumulator Card, the Unit will reset its activity registers. In this state it is fully discharged and the full transaction recording memory is available for recording future activities. The Unit will emit a single beep and return to its normal state of displaying time and date.

If the Accumulator Card becomes full, the "NEXT" Display Indicator will turn on, requesting another Accumulator Card to be inserted. Inserting a second Accumulator Card and pressing "OK" will cause the remaining records in the Unit to be downloaded into the second Accumulator Card. This sequence will continue until the Unit is completely discharged.

Only if all of the activity records in the Unit are download will the Unit reset its activity registers and becomes fully discharged. If, for any reason, the downloading process is aborted before it has finished, the activity records and registers in the Unit will not be reset. Downloading the activity records will start from the begining when a new Accumulator Card is inserted.
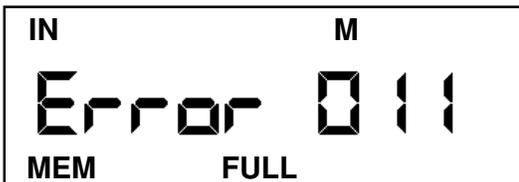
Downloading information from a Unit to an Accumulator Card is applicable both to Units that are primary data retainers and Units that are backup data retainers.

4. *TAV* Error Codes

4.1   Error 11: Unit Memory Full

Problem: The Unit will not register transactions.
Display:

```
IN                M              IN                M
 Error 011                       Unit FULL
MEM      FULL                    MEM      FULL
```
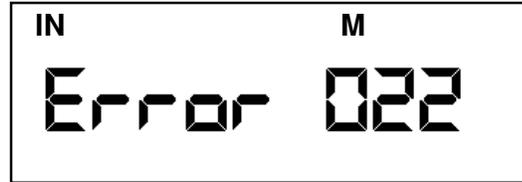
Solution or Required Action: Unit must be discharged into Accumulator Cards or a PC.

4.2   Error 22: Unit Memory Cannot be Read

Problem: The Unit memory cannot be read. This is a Unit hardware problem.
Display:

Solution or Required Action: Unit must be replaced and returned for repair.

```
IN                    M

Error  022
```

4.3   Error 23: Unit Memory Cannot be Written To

Problem: The Unit memory cannot be written to. This is a Unit hardware problem.
Display:

**Solution or Required Action:** Unit must be replaced and returned for repair.

```
IN                    M

Error  022
```

4.4   Error 52: Card Cannot be Read

Problem: The inserted Card cannot be read. This implies a Card hardware problem.
Display:

Solution or Required Action: The Card reading operation should be tried again. If the problem recurs, the Card is faulty and should be replaced.
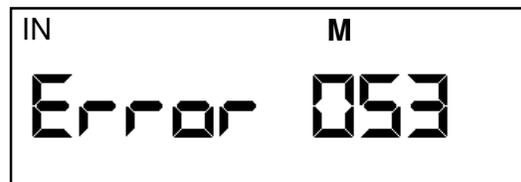
```
IN                    M

Error  052
MEM         FULL
```
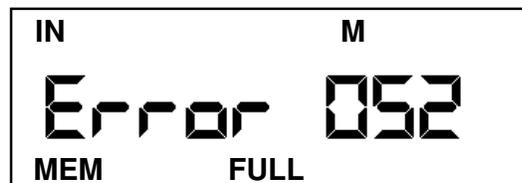
4.5   Error 53: Card Cannot be Written To

Problem: The inserted Card cannot be written to. This implies a Card hardware problem.
Display:

Solution or Required Action: The Card writing operation should be tried again. If the problem recurs, the Card is faulty and should be replaced.
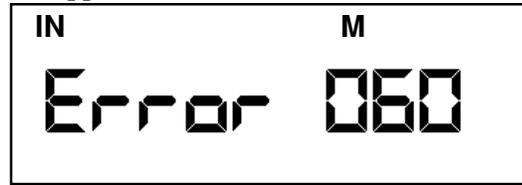
```
IN                    M

Error  053
```

4.6 Error 60: Card Does Not Belong to This System (Wrong Application Code)

Problem: The Application Code of the inserted Card does not correspond to that of the TAU Unit. The Card does not belong to this application or installation.

Display:

```
IN                    M
Error  060
```

Solution or Required Action:
Remove the Card and insert a Card that belongs to this installation and system.

4.7 Error 61: Incorrect Card Application Version.

Problem: The Application Version of the inserted Card does not correspond to that of the TAU Unit. This can be due to either an older Application Version in the Card or in the Unit.

Display:

```
IN                    M
Error  061
```
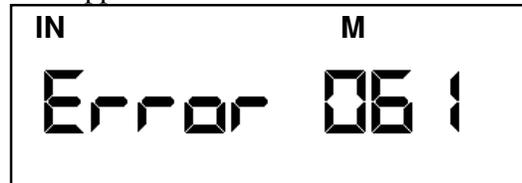
Solution or Required Action: If this error applies to a single or a few cards, they should be reissued to the Application Version in the TAU Unit.
If the problem applies to all of the Cards in the system, the Unit should be replaced with a Unit with the correct Application Version installed.

4.8 Error 62: Card Data Integrity Error.

Problem:
1) Card contents were modified illegally.
2) Last writing to the Card was incomplete.
3) Card has not been issued, or issuing failed.

```
IN                    M
Error  062
```

Display:

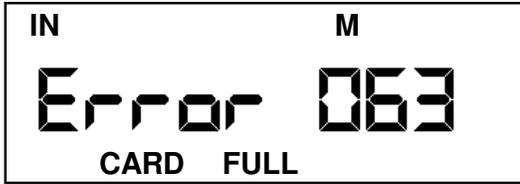**Solution or Required Action:** Card must be replaced or reissued.

4.9 Error 63: Card Memory Full.

Problem: Additional transactions cannot be written to the Card (the Card is configured as a Primary Data Retainer).

Display:

```
IN                    M
CArd FULL
```

```
IN              M
Error  063
    CARD   FULL
```
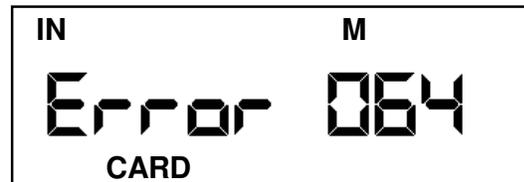
Solution or Required Action: 1) Card must be discharged to a PC, or
2) Card must be redefined as a Backup Data Retainer.

4.10 Error 64: Card Expired.

Problem: The Card expiration date has passed.
Display:

```
IN                  M
Error  064
    CARD
```
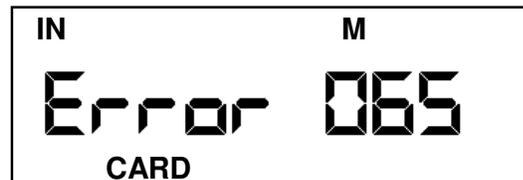
Solution or Required Action:
1) Extend expiration date of the Card, or
2) Disable expiration date verification feature in the Unit (by means of appropriate parameter).

4.11 Error 65: Card Inactive.

Problem: The Card is configured to an inactive status.
Display:

```
IN                  M
Error  065
      CARD
```

Solution or Required Action: Card must be redefined as Active at a Card Issuing Station.
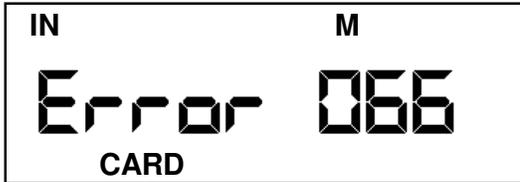
4.12 Error 66: Personal Card Transaction Requires Supervisory Confirmation.

Problem: The Personal Card transaction requires Supervisor Confirmation prior to inserting the employee's Personal Card, as a prerequisite to allowing and registering the incoming or outgoing activity.
Display:

```
IN                  M
NEEd SUPEr
        CARD
```

```
IN                    M

Error 066

     CARD
```

Solution or Required Action:
1) A Supervisor Card must be inserted prior to inserting the employee's Personal Card, or
2) Personal Card must be reconfigured to remove the Supervisory Confirmation requirement, or
3) The Unit may be reconfigured, by means of one of its parameters, so that Supervisory Confirmation is waived in all cases.

5.   Changing the Batteries in the 𝒯𝒜𝒰 Unit

The Batteries in the 𝒯𝒜𝒰 Unit are located in the battery compartment, in the rear bottom side of the Unit. Two "AA" batteries are installed.

Removing the Unit batteries does not alter or cause loss of data or parameters stored in the unit. The only corrective action required is resetting the correct date and time in the Unit.

In order to replace the batteries in the 𝒯𝒜𝒰 Unit, turn the Unit over, and loosen the two screws on the lower rear side of the Unit. Then remove the battery compartment cover. The two batteries are now revealed, and can be removed and replaced.
After changing the batteries, replace the battery compartment cover and fasten the two retaining screws.

Following battery replacement, the Unit time and date need to be set. This can be carried out in one of two ways:
1.   By inserting a Supervisor card, then setting the correct time and date of the Unit.
2.   By connecting the Unit to a Data Collection PC and updating the Unit time to the PC system time.

6.   𝒯𝒜𝒰 Unit Characteristics

The 𝒯𝒜𝒰 Unit includes:
➢   A CPU.
➢   Non-Volatile Read/Write Memory.
➢   A Real Time Clock (RTC).
➢   A one-line LCD display.

- ➢ Two pushbutton keys for operator interaction.
- ➢ A Smart Card Reader.
- ➢ A Battery Pack for normal powering of the unit elements.
- ➢ An audible Buzzer.

6.1   Packaging

The *TAU* Unit is packaged in an enclosure similar to a handheld remote control unit. The card reader slot is on the right side of the unit, and the LCD on its face. This handheld unit can be placed in a desk mounted housing or in a wall mounted retainer.

6.2   The TAU Unit Power Supply

The *TAU* Unit is powered by two "AA" size batteries. All relevant parameters and transactions are retained in a non-volatile memory. Thus, when the batteries are exchanged, only the current time and date need to be updated. No other information relating to unit configuration or accumulated transactions is lost due to removal of the unit batteries.

6.3   TAU Data Retention Regimes

The Unit memory retains 500 transactions, equivalent to over 4 man-months of typical activity. It can optionally be expanded to 18 or 36 man-months of data collection and retention.

In order to conserve power, the Unit CPU is placed in a dormant state whenever the Unit is not active. The CPU is awakened by an external event, such as inserting a Smart Card or pressing either front panel key. The Unit is also automatically awakened once a second to update the internal Real Time Clock and Date settings.

This power conservation scheme extends the battery life of a unit to up to six months in normal operation.

Activating the communications mode depletes the battery considerably faster than normal operation. Thus, a battery powered Unit should not be kept in the communications mode longer than is strictly necessary.

An external power supply is available as an option. It is recommended that *TAU* Units that are communication intensive should be connected to an external power supply. When such an external supply is available, the internal batteries may be removed unless operation is required during electrical power failures and brownouts.

6.4   TAU Communications

The TAU communicates with a PC through a special interfacing cord, connected to the PC serial port. The PC serial port should be set up to the following specifications:
- 9600 Baud
- 8 Bit characters
- No Parity
- 1 Stop Bit

The TAU communicates by means of a proprietary protocol. No hardware or software handshakes are required nor supported.