

HYDROLOGICAL PROCEDURE NO. 9

FIELD INSTALLATION AND MAINTENANCE OF CAPRICORDER 1598 DIGITAL EVENT WATER LEVEL RECORDER



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Of Capricorder 1598
Digital Event Water Level Recorder**

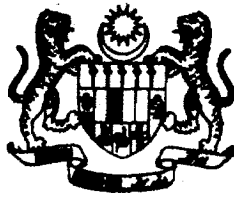
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**Field Installation and Maintenance
of Capricorder 1598
(Digital Event Water Level Recorder)**

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FIELD INSTALLATION AND MAINTENANCE OF CAPRICORDER 1598 — DIGITAL EVENT WATER LEVEL RECORDER

1.0 INTRODUCTION

The Capricorder 1598, digital event water level recorder is a modification of the standard Fischer and Porter analogue digital recorder (A.D.R.). It provides a punched tape record in binary — decimal code which is suitable for rapid conversion to computer input.

The Capricorder 1598 is a long term recorder in which the Time and Stage range is virtually unlimited, the life of the batteries and the length of paper tape available are the two main limiting factors. Despite this versatility of the recorder it is strongly recommended that the recorder is serviced at not longer than monthly intervals. (This should apply to *all* hydrological field recorders).

The right hand side code disc records the water level and the left hand side code disc records time. For both water level and time, *only the last two digits are recorded*. The actual time and stage are noted at "ON", "OFF" and "Intermediate" inspections, along with recorder values. As the code discs have different functions they operate independently; they are not geared together as they are in the Capricorder 1599, digital event rainfall recorder.

1.1 Stage:-

The input shaft driving the right hand side code disc is rotated by the movement of a float/counterweight stage sensing system. A metal tape connecting the float and counterweight passes over a pulley which is fitted to the end of the shaft. An *anti-surge* clutch is incorporated in the pulley assembly; this allows movements of the float pulley (i.e. surge within the well) without damaging the recorder when the right hand code disc is locked during a "punch-out". The standard pulley will have an operating circumference of 300 mm; as the code disc represents 100 digits, therefore $1 \text{ digit} = 3 \text{ mm}$. Other pulley sizes can be used; i.e. 100 mm circumference pulley where $1 \text{ digit} = 1 \text{ mm}$.

1.2 Time:-

An Ergas clock is mounted on the rear right-hand side of the recorder and is electronically connected to a stepping motor which is meshed to the shaft of the left hand code disc. The stepping motor will advance the code disc by one digit every time it is activated. The Ergas clock drives a time cam, a *cam follower* giving a "drop off" of the cam at regular time intervals closing an electrical contact which will activate the stepping motor. The *standard time cam* will have a regular six minute drop-off cycle; this means the left hand code disc will be moved 1 digit every 6 minutes ($1 \text{ digit} = 6 \text{ minutes}$). Different values of time input can be made available merely by using a different time cam; i.e. 15 min. time cam, where $1 \text{ digit} = 15 \text{ minutes}$.

There is an "alignment" facility for checking the setting between the code disc and the stepping motor; testing of the alignment can be made by placing the toggle switch into the "align" position and then pushing the "step" button on the control panel. If the alignment is correct the "66" digit position on the code disc will be in line with the pointer.

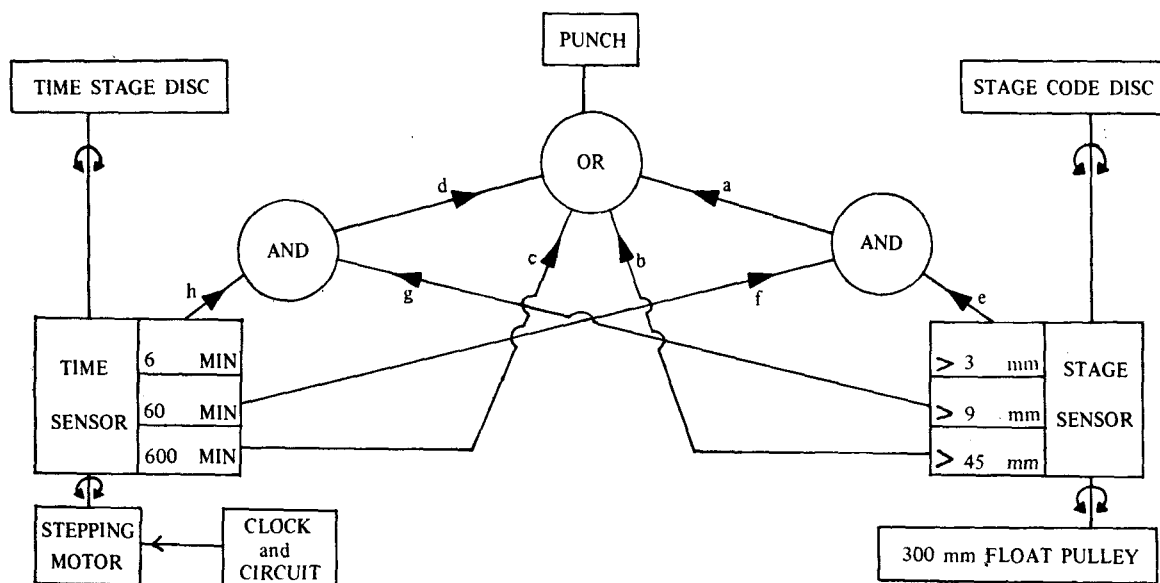
1.3 Punchout Sequence:-

A *stage sensing unit* mounted above the stage input shaft mixes stage and time information and thus controls the punchout rate (sequence) *according to the rate of change in stage*.

Where the stage input is a 300 mm circumference pulley (1 digit = 3 mm), and the time input is a 6 minute time cam (1 digit = 6 minutes), the recorder will punchout according to the following approximate sequence:—

- (i) Less than 3 mm change in water level within 10 hours; punchout every 10 hours. (at "99" position)
- (ii) Greater than 3 mm and less than 9 mm change in water level within 1 hour; punchout every 1 hour.
- (iii) Greater than 9 mm and less than 45 mm change in water level within 6 minutes; punchout every 6 minutes.
- (iv) Greater than 45 mm within 6 minutes; punchout *instantaneously* (punchout time takes max. of 15 seconds), time to within 6 minutes.

The punchout sequence is diagrammatically presented in Fig. 1 below.



Inputs on lines a or b or c or d will trigger a punchout.

Inputs in lines e and f will give an output on line a thereby triggering a punchout.

Inputs on lines g and h will give an output on line d thereby triggering a punchout.

Although the *sensing system* controlling the punchout sequence does not follow the above precisely, but, the actual values of stage and time are recorded to a high degree of accuracy. Basically, the recorder will punchout more frequently during periods of much activity (rapidly rising and falling stages) and less frequently during periods of little activity. Generally the recorder is more suitable for use on the smaller, "flashy" river.

Since only the last two figures of time can be recorded on the tape there must be at least *one control punchout for each revolution of the time code disc*. For this reason the recorder is designed to punch a record of time and stage when the time disc is in the "99" position; this is the ten hourly punchout listed under (i) above.

The stage sensing unit is designed to ensure that *at least one punchout will occur* for a movement of *less than half a revolution* of the stage code disc. This is necessary because only the last two digits of water level are recorded, and the possible clockwise and anticlockwise movements

of the disc would cause ambiguity of record if there was not a punchout at less than half a revolution. (i.e. where the disc reading is 90 and a movement of 50 takes place the new disc reading would then be 40, however, it is not known whether this is a rise or a fall, or whether the reading is 40 or 140 etc; thus the recorder must punchout for a change in stage of not more than 49 digits on the disc).

1.4 Code Discs:-

Both the right hand and left hand code disc have a series of "hills and valleys" (coding) which represent a 100 different positions (digits) on each disc in binary decimal code; each disc has units and tens digits of stage and time respectively.

A pair of "pointers" indicate the *last two figures* of stage and time respectively; these values would be recorded on the tape if a punchout was to be actuated at the time of observation.

1.5 Punchout:-

Upon the initiation of a punch cycle the right hand code disc is locked in position before actual punchout occurs; the locking procedure involves the movement of the right hand code disc to the nearest digit. As the left hand code disc "steps" at a constant movement of 1 digit it is always in correct alignment at the time of punchout, thus there is no movement of this disc during the locking procedure.

Punched tape recording is accomplished mechanically when the tape punch mechanism is pressed against the face of the code discs. Where a "hill" aligns with a punch, a hole results; where a "valley" aligns with a punch, no hole results. Thus the binary-decimal value of the position of the discs (input values) is read out as a permanent punched tape record.

The punchout is in a binary-decimal code where four binary digits 1,2,4 and 8 are combined in various ways to form a single decimal digit. For example, (i) the decimal digit 3 would be formed by adding binary digits 1 and 2; (ii) the decimal digit 7 would be formed by adding binary digits 1, 2, and 4. The standard paper tape is preprinted with sixteen binary digits (i.e. the equivalent of 4 decimal digits). Each punchout is on a separate line which is preprinted on the tape. There are large prepunched holes in the centre of the tape which cater for the sprocket drive and advance of the tape. In addition to the punchout of binary digits there are 2 holes punched out within the black lines printed on the tapes; these are alignment holes required by some types of tape readers or translators — Other than the 16 preprinted binary digit all other printed numbers are not relevant to the operation of Capricorders 1598.

1.6 Counters:-

As only the last 2 figures of both stage and time are recorded on the tape, digital counters are provided to enable a field check on the performance of the recorder.

For *stage* a small 3 digit counter is driven via a 1:1 gearing from the input shaft (low order disc). For every revolution of the input shaft the digital counter will advance one digit, thus where a 300 mm circumference float pulley is used 1 digit = 300 mm.

The *time counter* is electrically operated and plugs in the back (L.H.S.) of the recorder via the battery socket. Time is totalized in units of 0.1 of an hour (6 minutes). The time code disc should read the same as the last two digits on the counter. Presetting and resetting push-buttons are provided to establish initial agreement between the time counter and the time code disc.

1.7 Other Features:-

The recorder operates off a "9 volt" D.C. supply drawn from an external battery pack. Batteries are to be replaced every 6 months.

The punch cycle will take a maximum of 15 seconds to complete.

All functions of the recorder are controlled through a printed circuit housed in the grey metal case on the left hand side of the machine.

A small control panel with three switches allows manual operation of the machine.

2.0 INSTALLATION OF THE RECORDER

- 2.1 The recorder house must be rigid, weatherproof and dustproof.
- 2.2 The approximate dimensions of the instrument are 35 cm wide x 37 cm high x 35 cm deep.
- 2.3 Site the instrument to provide easy access to the front and right hand side.
- 2.4 The recorder should normally be mounted on a wooden bench at a convenient operating height (say 1 metre above the floor approximately).
- 2.5 Holes or slots are to be provided for passage of the steel float tape; ensure that the float and counterweight are more or less centrally located within the stilling well such that they can move throughout the entire operating range *without any obstruction*. (i.e. they must not touch the walls, floor, ladder etc).

Where a continuous slot has been cut a thin plate is to be fixed in the middle so that if the tape jumps off the pulley it will not fall the stilling well. The tape must not rub against the sides of these holes or slots.

- 2.6 The recorder should be secured to the bench with two $\frac{1}{4}$ inch bolts of sufficient length or suitable serews (preferably brass or galvanised) which pass through the front "feet".
- 2.7 Ensure that the steel tape connecting the float and counterweight is long enough to permit travel through the *maximum anticipated range in stage*. However, the length must not exceed this requirement, for if the metal tape is too long the counterweight will touch the bottom of the well before the float has risen through the the full range, and *this will cause the tape to jump off the float pulley*.
- 2.8 Handle the steel tape with extreme care. One accidental "*kink*" caused during transit or assembly may break the tape or cause it to jump off the drive pulley with the resultant loss of valuable record.
- 2.9 Do not use the steel tape if it is damaged; request the Instrument Services Depot for a replacement.
- 2.10 Use only the standard Capricorder float and counterweight supplied by the Instrument Services Depot, D.I.D., Ampang.
- 2.11 Ensure that the steel tape is correctly seated over the "spigots" on the float pulley and that it passes over the guide pulley.
- 2.12 Ensure that the *float is on the right hand side and the counterweight on the left hand side*. (i.e. when looking from the front of the recorder).
- 2.13 The *battery box* (9 volts) can be placed at any convenient position in the recorder house.

The wiring harness which plugs into the back left hand side of the recorder, incorporates the time counter and two wires for the battery box; ensure that these are connected to the correct terminals. Also check to see that the batteries within the battery box are correctly wired up in *series* and the all connections are reliable.

2.14 The portable "*time counter*" should be placed on the bench alongside the recorder.

3.0 **INSTALLATION OF THE RECORDING TAPE (PLACING A NEW ROLL OF TAPE)**

3.1 Make certain that the power is shut off. As there is no switch for "ON" and "OFF", one of the battery wires should be disconnected from the battery pack.

3.2 Remove the plastic chad tray from the punch arm assembly by lifting and tilting the top edge outward.

3.3 Remove the outer tape supply spool disc by rotating counter clockwise.

3.4 Place a full tape roll on the tape supply spool, positioned so that the "printed time numbers" are right side up facing the front of instrument.

3.5 Replace the outer tape assembly spool disc.

3.6 Pull the end of the tape off the supply roll leading it under the base of the punch arm assembly, between the tape drive sprocket and the paper retaining clamp and toward the front of the instrument. Ensure to keep the paper tape retaining clamp pressed down, do not engage the tape in the sprocket at this stage.

3.7 Withdraw about 50 cm of paper tape in this manner, extending about 25 cm beyond the tape drive sprocket at the base of the punch arm assembly.

3.8 Feed the end of the paper tape through the punch block; then take up the slack and seat the tape drive sprocket holes over the drive sprocket pins.

3.9 If additional tape is required after the tape has been meshed with the sprocket drive it is necessary to rotate the sprocket drive manually in a forward direction with one or two fingers. Do not pull hard on the tape without doing this.

3.10 Pull about 25 cm of tape up *behind* the upper paper guide to the take-up spool. Remove the spring belt drive from the spool. *The "nylon washer" (spacer) must be on the right hand side of the tape.*

3.11 Fold the end of the tape over and slip the end of the tape into the slit in the spool, inserting the tape down into the center portion of the spool. Make certain that the paper tape is square with the spool.

3.13 Hold the spool with tension on the paper tape and advance the spool slightly such that the drive sprocket ratchet has "*just tripped off*", this will ensure correct spacing of punches. Then replace the spring belt back into position ensuring that it is correctly seated in the groove on the cam shaft pulley and in the groove on the take up spool respectively. Do not stretch this unnecessarily.

3.14 Re-connect wire to battery pack.

4.0 INITIAL SETTING (INSTALLATION) OR RESETTING OF THE RECORDER

4.1 Stage Code Disc and Stage Counter Settings:-

This applies to the time of *installation*; or a *resetting* at "Tape On" where the difference between the stick gauge and the recorder is *greater than 0.02 metres* (say, a difference of 6 digits in the code disc readings where a 300 mm circumference pulley is used), otherwise no adjustment should be made. The difference varies from river to river and instruction as to specific differences for individual rivers will be given in due course.

Do not adjust the stage counter and stage disc at "Intermediate Inspections" or before completing the "Tape Off" procedure.

Disconnect the power supply

Read the stick gauge and divide this *value* by 3
(300 mm circumference pulley)

$$\text{Example: } - \frac{21.375}{3} = 7.125$$

This value is then used to derive settings for *the stage counter* and *the stage code disc* in the following way:-

(i) The *metre and decimetre* digits are used for setting the *stage counter* (i.e. 071). Where the value exceeds 99.999 metres only the units and tens value of metres is to be used, together with the decimetre value; this is because the stage counter has only 3 digits.

(ii) The *centimetre and millimetre* digits are used for setting the *code disc* position (i.e. 25).

To make the actual setting slacken off the knurl nuts on the back of the float pulley and rotate the code disc (right hand side) until the reading on both the stage counter and code disc correspond with the *value* derived for the setting (i.e. the stick gauge reading divided by 3). When the setting has been made retighten the knurl nuts, ensure the reading on the code disc does not change.

4.2 Time Code Disc and Time Counter Settings:-

This applies to the time of *installation* and *resetting* at "Tape On". *Do not* check the *alignment* or adjust the *time counter* and *time disc* at "Intermediate Inspections" or before completing the "Tape Off" procedure.

CONNECT THE POWER SUPPLY.

Before setting the timing, check the *alignment* by putting the toggle switch into the "Align" position and press the "step" button, release after activating. The time disc should then proceed to rotate to the "66" position as indicated by the pointer. If the time cam follower drops off during alignment the disc will probably continue to revolve for another revolution.

Where the disc fails to *align* at the "66" position, repeat the alignment procedure; if this fails to align a second time the recorder is to be removed and a replacement installed without delay.

Having checked and accepted the alignment return the toggle switch to the "Normal" position and press the "step" button to advance the time disc to an arbitrary starting value, this can be

anywhere *but avoid the "99" position* to save confusion (the recorder will automatically punch-out at this position for every revolution of the Time Disc.)

Set the Time Counter to agree with the time code disc reading, use the rezero and the advance buttons to assist.

5.0 ROUTINE OPERATION

5.1 *Only trained field staff are permitted to operate and maintain the Capricorder 1958.*

5.2 The recorder should be inspected at least once a month, and the portion of used tape must be *taken off on a monthly basis* (Tape Change).

5.3 On arrival at the station check to see if the clock is ticking. Before proceeding to service the recorders, *wait and see if the time advance is working*; every 6 minutes the Time Disc and Time Counter should advance when the cam follower drops off the time cam. Where this is not working correctly the recorder is to be removed and a replacement installed; note details of erratic behaviour in the log book and on data tablets.

5.4 Replace the *batteries* if they are due for replacement (i.e. every 6 months). It is useful to check the batteries with a test meter at every visit. Record the milliamps under load which should be about 420 with a minimum operating load of 350.

5.5 Ensure that the recorder is free from dust and insects.

5.6 *Never* try to move the *Time Disc* (left hand disc) with your hand. *Never* move the *Stage Disc* (right hand disc) with your hand while the power is still connected. In addition, when desilting the stilling well or engaging any other activity which is likely to cause the stage disc to rotate the *power must also be disconnected*.

5.7 *Extreme care* must be taken when *removing and replacing* the recorder cover such that the clock assembly and switch are not damaged, the clearance is minimal.

5.8 *Do not* try to *repair* or meddle with the recorder; if a failure or discrepancy has been detected the complete instrument is to be removed and a replacement installed.

5.9 *Stick Gauges*:- These must be *correctly maintained* in order that the readings will be valid. *Extreme care* must be taken when reading the stick gauge to ensure that a correct reading is observed, get as close to the gauge as possible when taking a reading.

In general stick gauges are to be read to the nearest 0.01 metre (1cm); where possible and when desirable an estimation to the nearest 0.001 metre (1mm) or 0.005 (5mm) can be made.

5.10 Ensure to check the following before leaving the instrument: -

- (i) that the clock is ticking,
- (ii) that *the battery wires are correctly connected to the battery terminals* (i.e. *Power On*),
- (iii) that the electrical socket at the rear of the recorder is correctly placed,
- (iv) that the float/counterweight pulley is positively engaged on the end of the stage input shaft, check to see that the knurl nuts are done up tightly,
- (v) that the *toggle switch is on "normal" position*,
- (vi) that the *time advance is working*.

5.11 The checks performed on "*Time*" and "*Stage*" are not to be regarded as a mere formality but must be used to *evaluate* and *correct* the performance of the recorder and of the station generally; immediate action must be taken to rectify faults.

6.0 TAPE ON

6.1 *Disconnect* the power supply.

6.2 Pull through 25 cm of tape and wind onto the take-up spool (Ref. Paragraph 3.9 – 3.14). Ensure that the sprocket ratchet *has just tripped off* when replacing the spring belt, such that the tape drive will be correctly tensioned and positive so that the 1st and 2nd punchouts will be correctly spaced.

6.3 Read the stick gauge and adjust the stage *counter and stage disc* in accordance with the requirements and method described in paragraph 4.1.

6.4 *Reconnect* the power supply.

6.5 Check the *Alignment* of the Time Disc and *adjust the time counter* such that the last 2 digits agree with the Time Disc reading. The Time Disc can be in any position.

6.6 Wait for the *time to advance* (left hand disc), *when this occurs actuate two manual punch-outs* and *note the actual time*. No manual punchouts should be carried out if the time disc reads 99. Wait for it to advance. The computer may interpret any extra 99's on the tape as a major advance in time (10 hours for the 6 minute machine).

6.7 Use a red felt tipped pen ("magic pen") to *draw a line on the tape* immediately above the punch block; this will be in the middle of the two manual punchouts.

6.8 *Note on the tape* (write on top of the take-up spool)

- River and Station Names
- Date
- Actual Time (of manual punchouts)
- Stick Gauge reading (at time of manual punchout)

6.9 *Note in the Logbook — on the tablets*

- River and station names
- Station Number, 7 figure system
- Time per digit
- Pulley circumference
- Datum: M.S.L./Assumed, delete which does not apply.
- "ON", in the blank space provided.
- Date
- Actual Time (of manual punchout)
- Time from origin. By using the date and time refer to Table 1 (Capricorder time check tables) and note the appropriate value.
- Recorder Time, a 2 digit number *read from the punched tape* (left hand side)
- Counter Time, a 4 digit number
- Stage Counter, a 3 digit number
- Recorder Stage, a 2 digit number *read from the punched tape* (right hand side)

- *X3*, treat the stage counter and recorder stage reading as 1 number and multiply by 3, enter this value in the “X3” space. Show the decimal point.
- Stick Gauge reading. (at time of manual punchout)
Note: the above 2 entries should be the same or in close agreement.
- Remarks
- Initials, of observer.

6.10 *Note in the Logbook — on the ruled lines*

- other useful information related to the visit, computations, etc.

7.0 INTERMEDIATE INSPECTIONS

7.1 *Do not* adjust the Time and Stage Counters or the Time and Stage Discs.

7.2 *Do not* carry out an “alignment test”.

7.3 Wait for the *time to advance* (left hand disc); *when* this occurs *actuate two manual punch-outs* and *note the actual time*. No manual punchouts should be carried out if the time disc reads 99. Wait for it to advance. The company may interpret any extra 99's on the tape as a major advance in time (10 hours for the 6 minute machine).

7.4 Use the felt tipped pen (“magic pen”) to *draw a line on the tape* immediately above the punch block; this will be in the middle of the two manual punchouts.

7.5 *Note in the Logbook — on the tablets*

- “INSP” in the blank space provided.
- Date
- Actual Time (of manual punchout)
- Time from origin. By using the date and time refer to Table 1 (Capricorder time check tables) and note the appropriate value.
- Diff (difference), this is the difference between successive entries of the “time from origin”.
- Recorder Time, a 2 digit number *read from the punched tape* (left hand side)
- Counter Time, a 4 digit number
Note: The *last 2 digits* of counter time should agree with the Recorder Time entry.
- Diff (difference), this is the difference between successive entries of Counter Time.
Note: The *diff.* between successive entries of “time from origin” should agree with the *diff.* between successive entries of “counter time”
- Stage Counter, a 3 digit number.
- Recorder Stage, a 2 digit number *read from the punched tape* (right hand side)
- *X3*, treat the stage counter and recorder stage readings as 1 number and multiply by 3, enter this value in the “X3” space.
Show the decimal point.
- Stick gauge reading. (at time of manual punchout)
Note: the above 2 entries should be the same or in close agreement.
- Remarks
- Initials, of observer

7.6 *Note in the logbook — on the ruled lines*

- Other useful information related to the visited, computations, etc.

8.0 TAPE OFF

- 8.1 At the end of the recording period (monthly) the recorded portion of the tape should be removed by the following procedure.
- 8.2 *Do not* adjust the time and stage counters, the time and stage disc or carry out "alignment test" before completing the following "Tape Off" procedure.
- 8.3 Wait for the *time to advance* (left hand disc); *when this occurs actuate two manual punch-outs and note the actual time.* No manual punchouts should be carried out if the time disc reads 99. Wait for it to advance. The computer may interpret any extra 99's on the tape as a major advance in time (10 hours for the 6 minute machine).
- 8.4 *Disconnect* the power supply.
- 8.5 Use a red felt tipped pen ("magic pen") *to draw a line on the tape* immediately above the punch block; this will be in the middle of the two manual punchouts.
- 8.6 Advance the tape such that there is about 20 – 30 cm of blank tape above the punch block.
- 8.7 *Note on the tape* (10 – 20 cm away from the last punchout, write on top of the take-up spool)
- River and station names
 - Date
 - Actual Time (of manual punchouts)
 - Stick Gauge reading (at time of manual punchout)
- 8.8 *Note in the Logbook — on the tablets*
"OFF" in the blank space provided
- Date
 - Actual Time (of manual punchout)
 - Time from origin. By using the date and time refer to Table 1 (Capricorder time check tables) and note the appropriate value.
 - Diff. (difference), this is the difference between successive entries of the "time from origin".
 - Recorder Time, a 2 digit number *read from the punched tape* (left hand side).
 - Counter Time, a 4 digit number.
 - *Note:* The last 2 digits of counter time should agree with the Recorder Time entry.
 - Diff. (difference), this is the difference between successive entries of Counter Time.
Note: The diff. between successive entries of "time from origin" should agree with the diff. between successive entries of "counter time".
 - Stage Counter, a 3 digit number.
 - Recorder Stage, a 2 digit number *read from the punched tape* (right hand side).

- X3, treat the stage counter and recorder stage readings as 1 number and multiply by 3, enter this value in the "X3" space. Show the decimal point.
- Stick Gauge reading (at time of manual punchout).
Note: The above 2 entries should be the same or in close agreement.
- Remarks
- Initials, of observer

8.9 *Note in the logbook — on the ruled lines*

- Other useful information related to the visit, computations, etc.

8.10 Before cutting and removing the tape it is convenient to carry out any testing prior to resetting the recorder for operation (Tape On).

Always cut the tape above the punch block as this will save threading it through again. Having done this the test portion of the data tape must be detached and destroyed.

8.11 Having annotated the tape and completed entries in the logbook one of the tablets is to be detached from the logbook and glued to the "*on end*" of the tape. The tablet should be placed such that the "River Name" end of the tablet is closest to the punched record, however, not closer than 10cm. Only glue a 2 – 3 cm wide margin at the "River Name" end of the tablet. Ensure that the details noted on the tape are not covered over.

9.0 TIME CHECK AND TIME CHECK TABLES

Tables have been prepared to assist in checking *Actual Time* against Recorder Time. The tables relate to an arbitrary origin of 1 January at 0000 hours and give values of time in hours (main table) and tenths of an hour (sub table); this corresponds with the format of recorder and counter time which is also in hours and tenths of an hour. By using the *Actual Time* (Month, Date, hours, minutes) a "*time from origin*" value is obtained from the tables.

For the Capricorder 1598 the check on "Actual Time" and "Recorder Time" is not a direct check but is made in the following way: -

(i) Firstly, check the last two figures of the "Time Counter" reading against the "Recorder Time" value as read from the punched tape. As these should be set in agreement initially they *should agree at subsequent checks*.

(ii) Secondly, compare the difference between successive entries of the "Time From Origin" values (actual time) against the difference between successive entries of the "Counter Time" values; ideally these should agree but a certain time error is acceptable. Where the difference exceeds 0.5 hours per month the recorder is to be removed and a replacement installed. *Note*, that this is a check against "*Counter Time*" and only indirectly serves as a check on recorder time if the check under (i) above is in agreement.

If the above checks under (i) and (ii) above reveal any unacceptable *irregularities* the recorder complete with the counter is to be removed and returned to the Instrument Services Depot, D.I.D., Ampang for repairs. Where it is *known* that only the counter is faulty then this item need only be replaced.

Example of Time Check:-

	DATE	TIME					
		Actual (Hr/ min.)	From origin	Diff.	Rec.	Counter	Diff.
ON	18/12/73	1248	8460.8		33	083.3	
INSP	21/12/73	1147	8507.7	46.9	03	130.3	47.0
OFF	28/12/73	1359	8677.9	170.2	05	300.5	170.2

Note, in the above example the various time checks are underlined.

Non-Standard Circumstances: (using time check tables)

(i) *Leap Year* — where this occurs the tables can still be used, but when the period being checked covers the end of February an adjustment of *24.0 hours* must be added to the difference.

(ii) *End of the year overlap* — the number of hours in one year (not leap year) is 8760. Where the period being checked goes past 31 December the difference in time between successive visits is calculated in 2 steps; firstly calculate the difference between the first value and 8760, and secondly add this to the second value.

Examples: -

	DATE	TIME					
		Actual (Hr/ min.)	From origin	Diff.	Rec.	Counter	Diff.
ON	5/12/73	1520	81273		71	107.1	
OFF	2/1/74	1513	39.2	671.9	90	779.0	671.9

Related Calculations — (i)
$$\begin{array}{r} 8760.0 \\ - 8127.3 \\ \hline 632.7 \end{array}$$
 (ii)
$$\begin{array}{r} 632.7 \\ + 39.2 \\ \hline \text{Diff} = 671.9 \end{array}$$

(iii) Where it is known that the time counter has passed the 9999 position during the period of record, it is necessary to adjust the "Counter Time" reading by simply placing, 1, 2, or 3 etc. in front of the 4 figure number read from the counter (i.e. depending on the number of times the counter has passed the 9999 position.)

Example: -

	DATE	TIME					
		Actual (Hr/ min.)	From origin	Diff.	Rec.	Counter	Diff.
ON	14/1/74	1158	9083.9		64	706.4	
OFF	29/1/74	1227	9444.4	360.5	68	1066.8	360.4

10.0 LOGBOOK

There is to be a logbook for every recorder station, preferably this is to be kept at the site in the recorder house. The logbook for the Capricorder 1598 will be printed and will include the following format on every page.

- a detachable data tablet
- an identical data tablet which will remain in the logbook (carbon-copy).
- a space with lines for miscellaneous information, computations, etc.

Entries are to be made in the logbook at "Chart On," "Chart Off", and "Intermediate" Inspections.

On completion of a logbook it should then be filed at the State D.I.D. Office.

Refer to Appendix II showing a "sample page" of a suitable logbook.

11.0 MAINTENANCE

It is extremely important to keep the recorder house and the recorder itself free from dirt and insects. Keep a brush and/or rag in the recorder house for this purpose; use insect repellent or other means to keep the housing free of insects.

Batteries are to be replaced every 6 months; it is better to replace batteries more frequently than risk failure. Ensure that the batteries are correctly *connected-up*

Periodically check float, counterweight, and steel tape for damage.

Ensure that the stick gauges are readable and in good condition generally.

Periodically flush the intake pipes and desilt the stilling well, make sure at least one intake pipe is below the water level at all times.

Never oil any component of the recorder.

Whenever a recorder is known to be faulty and in need of repair it is to be removed and sent to the Instrument Services Depot, D.I.D. Ampang, without delay. *All* recorders should be sent for a general overhaul at least once in every *two years*. Replacement recorder should be installed without delay in order that continuity of record is maintained.

The code discs must be taped to the main assembly during transit.

12.0 HANDLING OF TAPES

As it is essential that the edges of the tapes are not damaged they must be kept in a small container (plastic container would be suitable) during transit. This includes transit from the station to the State D.I.D. Office, and from the State Office to D.I.D. Headquarters. *Do not* place these loosely in the landrover, your pocket, or briefcase. When rolling the tape ensure that it is rolled loosely and that the internal diameter is not too small (say, at least 2 cm. diameter).

13.0 SUBMISSION OF TAPES TO D.I.D. HEADQUARTERS.

The punched tapes complete with the attached data tablet are to be submitted to D.I.D. Headquarters on a *monthly basis within two weeks after the end of the month*.

All tapes are to be sent by registered mail.

APPENDIX I

Operating Instructions — Capricorder 1598 (Water Level Recorder) (To be kept in the Recorder House)

GENERAL:

- Remove the *data tape* on a monthly basis.
- Replace the *batteries* on a routine basis, do not risk failure.
- *Take extreme care* when removing and replacing the recorder cover.
- Check *electrical connections*; batteries, battery pack terminals, recorder socket, etc.
- Wait to see if the "*Time Advance*" works, time disc and time counter.
- Never try to move the *Time Disc* (left hand side) with your hand.
- Never move the *Stage Disc* (right hand side) until the power has been disconnected.
- *Note the difference* between actual time and recorder time, and between actual stage and recorder stage.
- Any portion of *Test Tape* is to be detached from the data tape.
- Ensure *Stick Gauges* are readable, vertical (where applicable), and correctly maintained.
- *Clean* the recorder house, station enclosure, etc.
- Check all other aspects of the station and installation generally.
- Check that the *Toggle switch* is on "normal position" and that the "*Power is On*" before leaving the station.

- Check that the nuts locking the *Float Pulley* are tight so that there is no slipping.
- Keep the *time check tables* and *logbook* at the station.
- Take *immediate action* to rectify problems

TAPE ON:

1. *Disconnect Power*, thread and attach tape
2. *Read Stick Gauge* and adjust *stage counter* and *stage disc* where necessary; refer Procedure
3. *Connect Power*, check alignment of *time disc*, set disc anywhere (except "99"), set counter to agree with disc.
4. *Wait for time to advance*, when this occurs *actuate 2 manual punchouts* and *note actual time*.
5. Use a red "*Magic Pen*" to draw a line between the 2 manual punchouts.
6. *Note on the Tape*: - River and Station names; Date and Actual Time (of manual punchouts), stick G. reading.
7. *Note in the Logbook, on the Tablets*
 - River and station names; station number; Time per digit; pulley circumference.
 - Datum: M.S.L./Assumed, delete which does not apply.
 - "ON" in the blank column
 - Date and Actual Time (of manual punchouts); Time From Origin (Refer Tables)
 - Recorder Time (*read from punched tape, left hand side*), Counter Time.
 - Stage Counter; Recorder Stage (*read from punched tape, right hand side*).
 - X3, treat "stage counter" and "recorder stage" readings as one number and multiply by 3.
 - Stick Gauge reading, this should agree or be close to the "X3" entry.
 - Remarks; Initials of observer.
8. *Note in the Logbook on the ruled lines* — other useful information, computations, etc.

INTERMEDIATE INSPECTIONS:

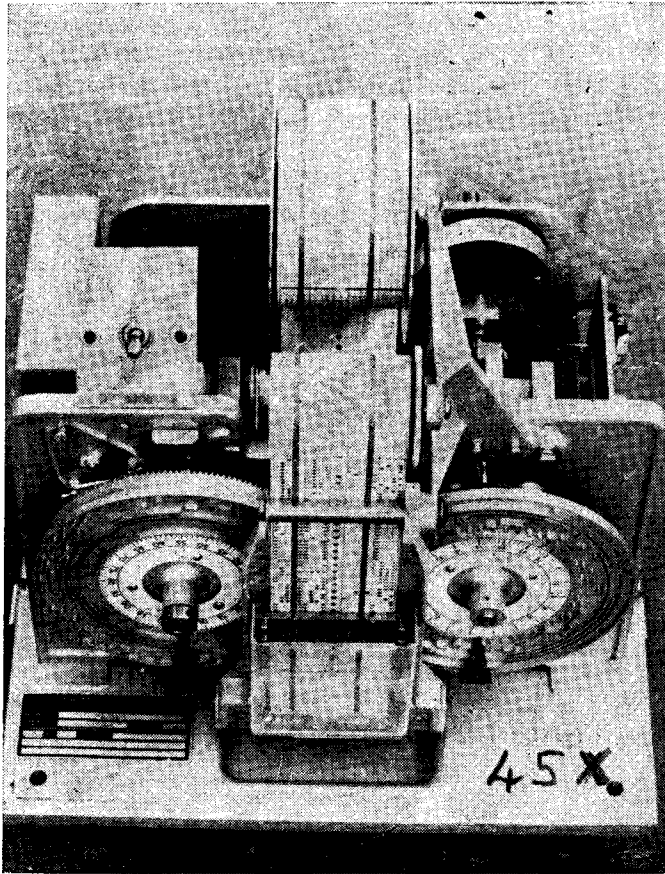
1. *Do not* adjust Time and Stage Counters or Time and Stage Discs; *Do not* do an "*alignment test*".
2. *Wait for time to advance*, when this occurs *actuate 2 manual punchouts* and *note actual time*.
3. Use a red "*Magis Pen*" to draw a line between the 2 manual punchouts.
4. *Note in the Logbook, on the Tablets*
 - "INSP" in blank space; Date and Actual Time (of manual punchouts); Time from origin.
 - Recorder Time (*read from punched tape, left hand side*); Counter Time.
 - Difference — between successive entries of Counter Time.
 - Stage Counter; Recorder Stage (*read from punched tape, right hand side*).

- “X3”, treat Stage Counter and Recorder Stage readings as one number and multiply by 3.
 - Stick Gauge reading, this should agree or be close to the “X3” entry.
 - Remarks; Initials of observer.
5. *Note in the Logbook, on the ruled lines* — other useful information, computations, etc.

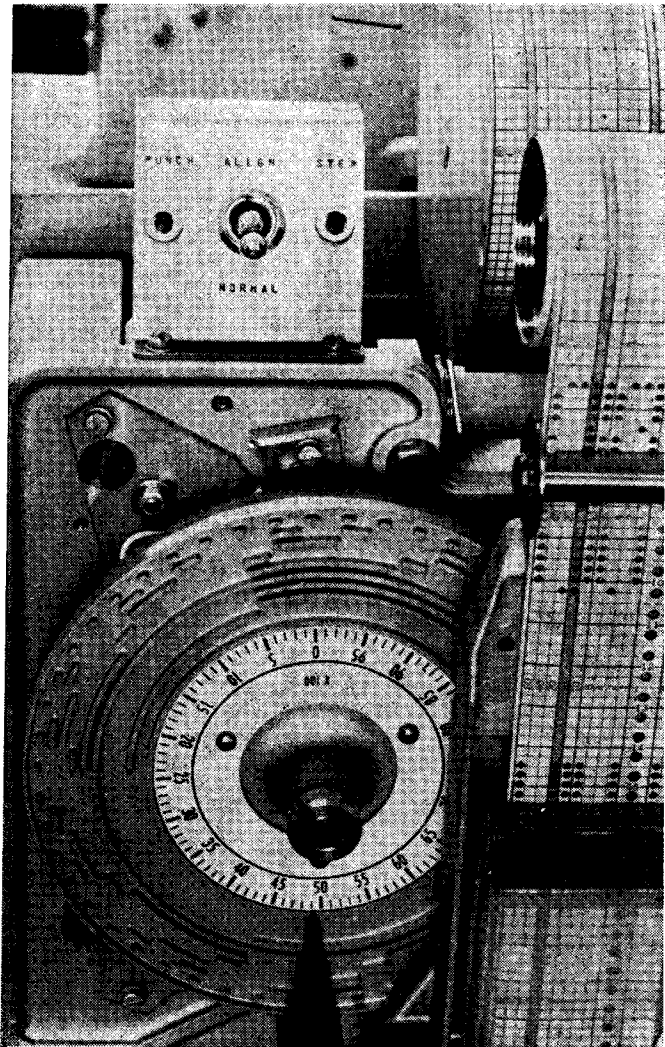
TAPE OFF:

1. *Do not* adjust time and stage counters, time and stage discs, or do an alignment test prior to “Tape Off”
2. *Wait for time to advance*, when this occurs actuate 2 manual punchouts and *note actual time*.
3. *Disconnect power*.
4. Use a red “Magic Pen” to draw a line between the 2 manual punchouts.
5. *Note on the Tape* — River and Station names; Date and Actual Time (of Manual Punchouts); Stick Gauge reading.
6. *Note in the Logbook, on the Tablets*.
 - “OFF” in blank space; Date and Actual Time (of Manual Punchouts); Time From Origin (refer tables)
 - Difference — between successive entries of time from origin.
 - Recorder Time (*read from punched tape*, left hand side); Counter Time.
 - Difference — between successive entries of Counter Time.
 - Stage Counter; Recorder Stage (*read from punched tape*, right hand side).
 - “X3”, treat Stage Counter and Recorder Stage readings as one number and multiply by 3.
 - Stick Gauge reading, this should agree or be close to the “X3” entry.
 - Remarks; Initials of Observer.
7. *Note in the Logbook, on the ruled lines* — other useful information, computations, etc.
8. Remove Tape; Detach 1 completed tablet from the logbook and glue to the data tape.

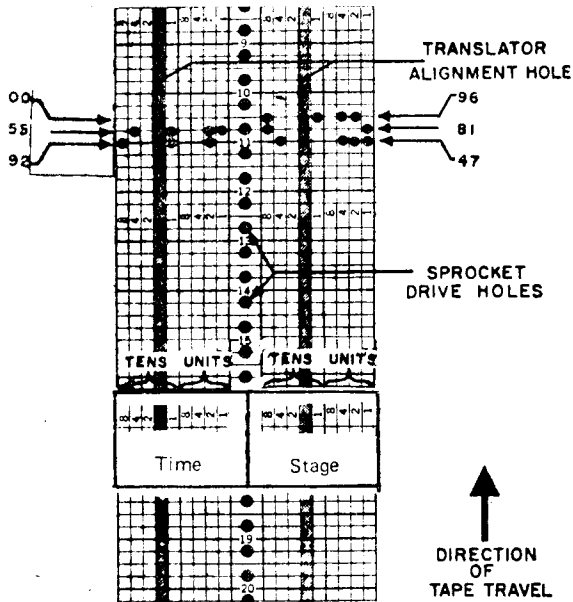
NOTE: Refer to the contents of the Operating Procedure for more detailed instructions.



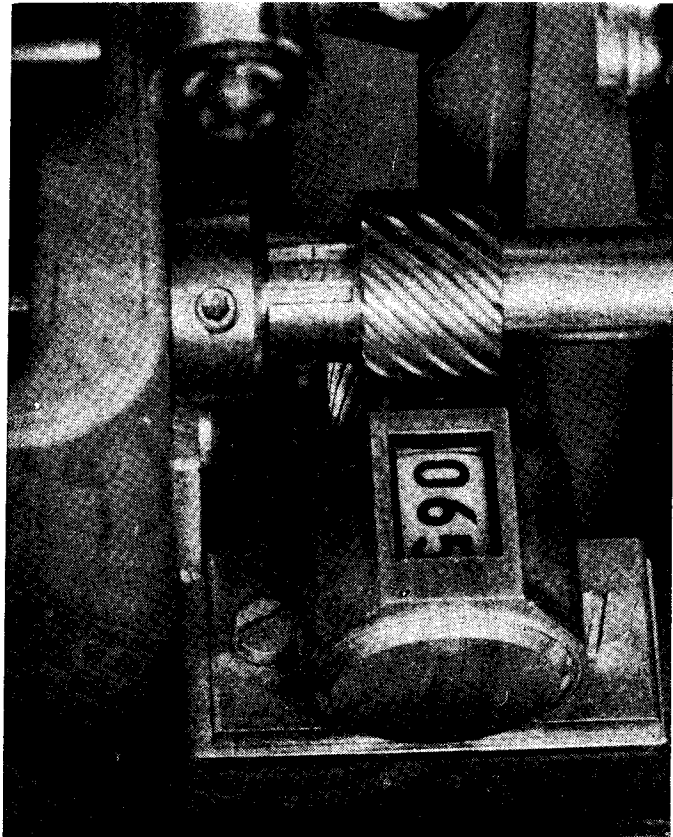
General view of Capricorder 1598



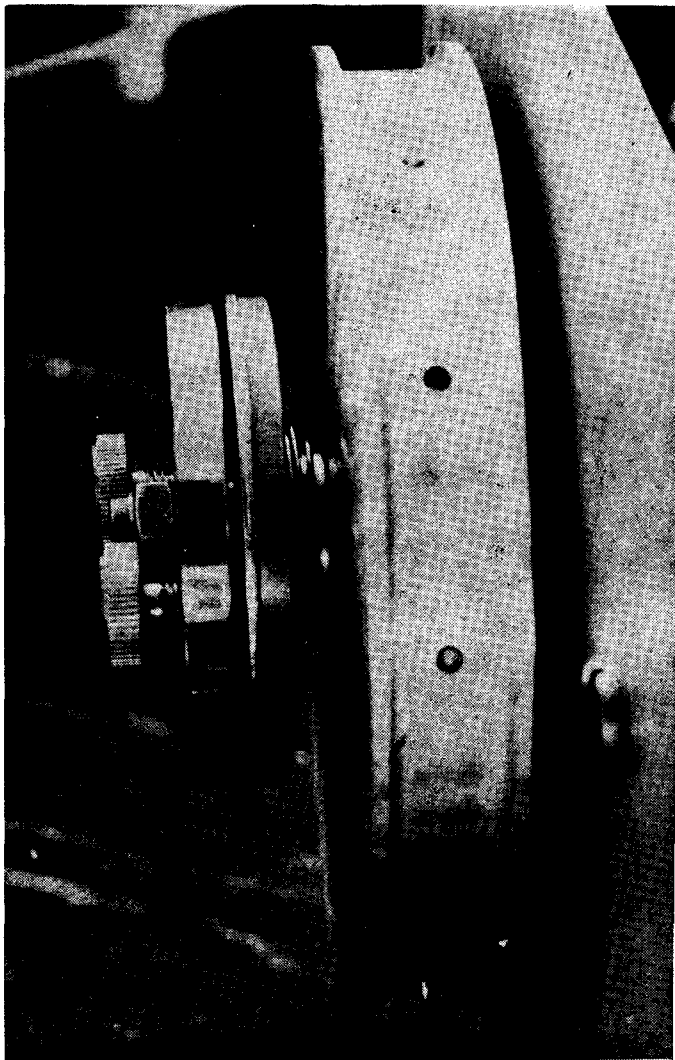
Time Code Disc and Control Panel



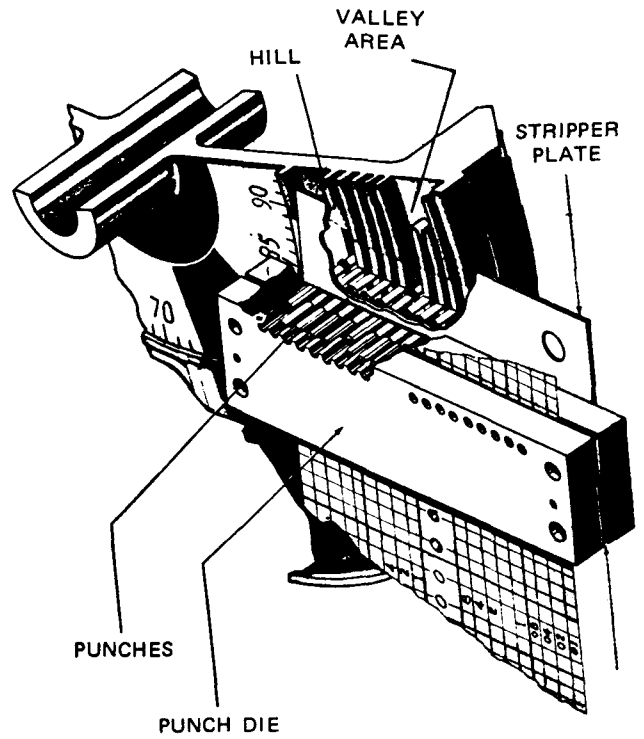
Data Recording Tape



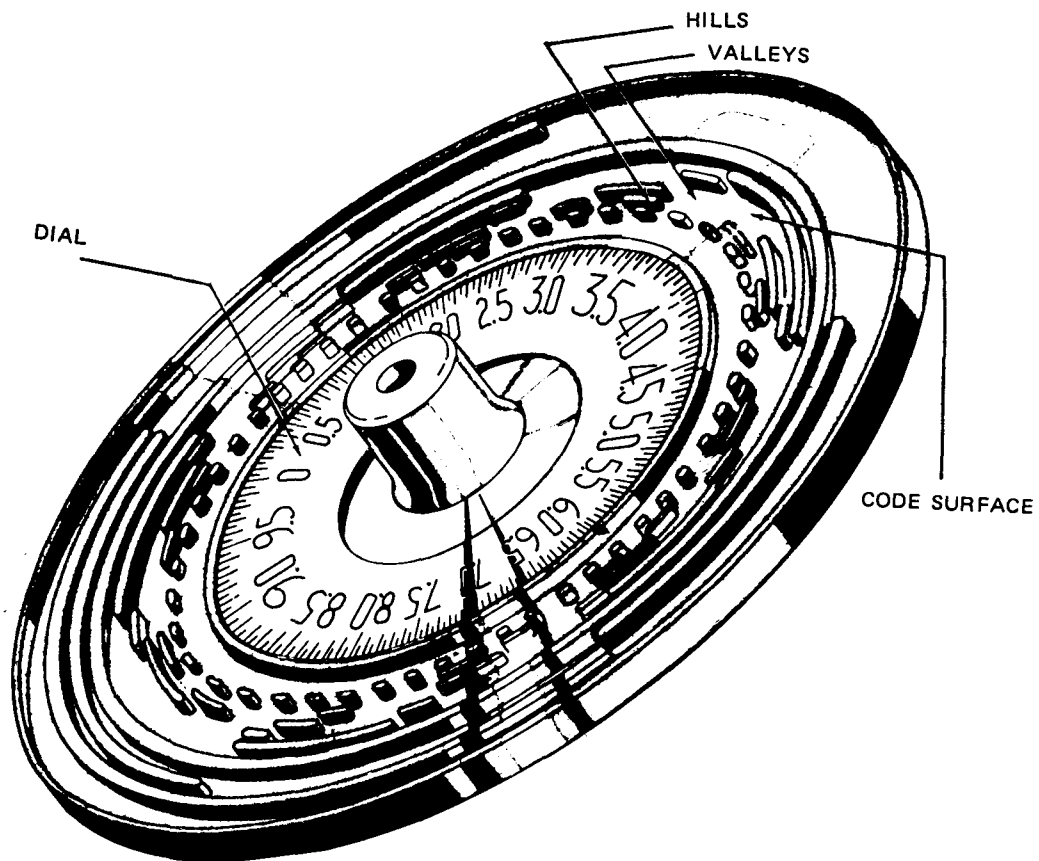
Stage Counter



330mm Circumference Pulley-Spring loaded



Punching Mechanism



Code Disc

Sample Page of a Suitable Logbook.

Sample Page of a Suitable Logbook.

RIVER:

STATION NAME:

STATION NUMBER:

--	--	--	--	--	--	--

Time per digit

Pulley circumference

minutes

mm

[illegible]

TABLE I
APPENDIX III

Time Check Tables for Capricorder 1599 (Rainfall Recorder) and Capricorder 1598 (Water Level Recorder)

BULAN JANUARI																									
HARI	JAM																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
2	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
3	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	
4	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	
5	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	
6	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	
7	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	
8	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	
9	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	
10	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	
11	241	242	243	244	245	246	247	248	249	250	251	252	253	264	255	256	257	258	259	260	261	262	263	264	
12	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	
13	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	
14	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	
15	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	559	360	
16	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	
17	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	
18	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	
19	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	
20	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	
21	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	
22	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	
23	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	
24	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	
25	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	
26	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	
27	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	
28	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	
29	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	
30	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	
31	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	

MINIT

0-5	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-53	54-59
0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

BULAN FEBRUARI																											
JAM																											
HARI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768			
2	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792			
3	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816			
4	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840			
5	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864			
6	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888			
7	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912			
8	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936			
9	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960			
10	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984			
11	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008			
12	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032			
13	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056			
14	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080			
15	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104			
16	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128			
17	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152			
18	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1167	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176			
19	1177	1																									

BULAN MAC																									
HARI	JAM																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	
2	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	
3	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	
4	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	
5	1513	1514	1515	1516	1517	1518	1519	1520	1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	
6	1537	1538	1539	1540	1541	1542	1543	1544	1545	1546	1647	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560	
7	1561	1561	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581	1582	1583	1584	
8	1585	1586	1587	1588	1589	1590	1591	1591	1593	1594	1595	1596	1597	1598	1599	1600	1601	1602	1603	1604	1605	1606	1607	1608	
9	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620	1621	1622	1623	1624	1625	1626	1627	1628	1629	1630	1631	1632	
10	1633	1634	1635	1646	1637	1638	1639	1640	1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	
11	1657	1658	1659	1660	1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1675	1676	1677	1678	1679	1680	
12	1681	1682	1683	1684	1685	1686	1687	1688	1689	1690	1691	1692	1693	1694	1695	1686	1697	1698	1699	1700	1701	1702	1703	1704	
13	1705	1706	1707	1708	1709	1710	1711	1712	1713	1714	1715	1716	1717	1718	1719	1720	1721	1722	1723	1724	1725	1726	1727	1728	
14	1729	1730	1731	1732	1733	1734	1735	1736	1737	1738	1739	1740	1741	1742	1743	1744	1745	1746	1747	1748	1749	1750	1751	1752	
15	1753	1754	1755	1756	1757	1758	1759	1760	1761	1762	1763	1764	1765	1766	1767	1768	1769	1770	1771	1772	1773	1774	1775	1776	
16	1777	1778	1779	1780	1781	1782	1783	1784	1785	1786	1787	1788	1789	1790	1791	1792	1793	1794	1795	1796	1797	1798	1799	1800	
17	1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	1814	1815	1816	1817	1818	1719	1820	1821	1822	1823	1824	
18	1825	1826	1827	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	1839	1840	1841	1842	1843	1844	1845	1846	1847	1848	
19	1849	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	
20	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	
21	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	
22	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	
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24	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
25	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
26	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
27	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	
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29	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	
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31	2137	2138	2139	2140	2141	2042	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	

MINIT										
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BULAN APRIL																								
JAM																								
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2	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208
3	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232
4	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256
5	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280
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7	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328
8	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352
9	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2375	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376
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19	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616
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21	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664
22	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688
23	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712
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27	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808
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MINIT																								
	0-5		6-11		12-17		18-23		24-29		30-35		36-41		42-43		48-53		54-59					
	0.0		0.1		0.2		0.3		0.4		0.5		0.6		0.7		0.8		0.9					

BULAN JUN

JAM

HARI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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2	3649	3650	3651	3652	3653	3654	3655	3656	3657	3658	3659	3660	3661	3662	3663	3664	3665	3666	3667	3668	3669	3670	3671	3672
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9	3817	3818	3819	3820	3821	3822	3823	3824	3825	3826	3827	3828	3829	3830	3831	3832	3833	3834	3835	3836	3837	3838	3739	3840
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16	3985	3986	3987	3988	3989	3990	3991	3992	3993	3994	3995	3996	3997	3998	3999	4000	4001	4002	4003	4004	4005	4006	4007	4008
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21	4105	4106	4107	4108	4109	4110	4111	4112	4113	4114	4115	4116	4117	4118	4119	4120	4121	4122	4123	4124	4125	4126	4127	4128
22	4129	4130	4131	4132	4133	4134	4135	4136	4137	4138	4139	4140	4141	4142	4143	4144	4145	4146	4147	4148	4149	4150	4151	4152
23	4153	4154	4155	4156	4157	4158	4159	4160	4161	4162	4163	4164	4165	4166	4167	4168	4169	4170	4171	4172	4173	4174	4175	4176
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MINIT

0-5	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-53	54-59
0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

BULAN JULAI

JAM

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2	4369	4370	4371	4372	4373	4374	4375	4376	4377	4378	4379	4380	4381	4382	4383	4384	4385	4386	4387	4388	4389	4390	4391	4392
3	4393	4394	4395	4396	4397	4398	4399	4400	4401	4402	4403	4404	4405	4406	4407	4408	4409	4410	4411	4412	4413	4414	4415	4416
4	4417	4418	4419	4420	4421	4422	4423	4424	4425	4426	4427	4428	4429	4430	4431	4432	4433	4434	4435	4436	4437	4438	4439	4440
5	4441	4442	4443	4444	4445	4446	4447	4448	4449	4450	4451	4452	4453	4454	4455	4456	4457	4458	4459	4460	4461	4462	4463	4464
6	4465	4466	4467	4468	4469	4470	4471	4472	4473	4474	4475	4476	4477	4478	4479	4480	4481	4482	4483	4484	4485	4486	4487	4488
7	4489	4490	4491	4492	4493	4494	4495	4496	4497	4498	4499	4500	4501	4502	4503	4504	4505	4506	4507	4508	4509	4510	4511	4512
8	4513	4514	4515	4516	4517	4518	4519	4520	4521	4522	4523	4524	4525	4526	4527	4528	4529	4530	4531	4532	4533	4534	4535	4536
9	4537	4538	4539	4540	4541	4542	4543	4544	4545	4546	4547	4548	4549	4550	4551	4552	4553	4554	4555	4556	4557	4558	4559	4560
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11	4585	4586	4587	4588	4589	4590	4591	4592	4593	4594	4595	4596	4597	4598	4599	4600	4601	4602	4603	4604	4605	4606	4607	4608
12	4609	4610	4611	4612	4613	4614	4615	4616	4617	4618	4619	4620	4621	4622	4623	4624	4625	4626	4627	4628	4629	4630	4631	4632
13	4633	4634	4635	4636	4637	4638	4639	4640	4641	4642	4643	4644	4645	4646	4647	4648	4649	4650	4651	4652	4653	4654	4655	4656
14	4657	4658	4659	4660	4661	4662	4663	4664	4665	4666	4667	4668	4669	4670	4671	4672	4673	4674	4675	4676	4677	4678	4679	4680
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16	4705	4706	4707	4708	4709	4710	4711	4712	4713	4714	4715	4716	4717	4718	4719	4720	4721	4722	4723	4724	4725	4726	4727	4728
17	4729	4730	4731	4732	4733	4734	4735	4736	4737	4738	4739	4740	4741	4742	4743	4744	4745	4746	4747	4748	4749	4750	4751	4752
18	4753	4754	4755	4756	4757	4758	4759	4760	4761	4762	4763	4764	4765	4766	4767	4768	4769	4770	4771	4772	4773	4774	4775	4776
19	4777	4778	4779	4780	4781	4782	4783	4784	4785	4786	4787	4788	4789	4790	4791	4792	4793	4794	4795	4796	4797	4798	4799	4800
20	4801	4802	4803	4804	4805	4806	4807	4808	4809	4810	4811	4812	4813	4814	4815	4816	4817	4818	4819	4820	4821	4822	4823	4824
21	4825	4826	4827	4828	4829	4830	4831	4832	4833	4834	4835	4836	4837	4838	4839	4840	4841	4842	4843	4844	4845	4846	4847	4848
22	4849	4850	4851	4852	4853	4854	4855	4856	4857	4858	4859	4860	4861	4862	4863	4864	4865	4866	4867	4868	4869	4870	4871	4872
23	4873	4874	4875	4876	4877	4878	4879	4880	4881	4882	4883	4884	4885	4886	4887	4888	4889	4890	4891	4892	4893	4894	4895	4896
24	4897	4898	4899	4900	4901	4902	4903	4904	4905	4906	4907	4908	4909	4910	4911	4912	4913	4914	4915	4916	4917	4918	4919	4920
25	4921	4922	4923	4924	4925	4926	4927	4928	4929	4930	4931	4932	4933	4934	4935	4936	4937	4938	4939	4940	4941	4942	4943	4944
26	4945	4946	4947	4948	4949	4950	4951	4952	4953	4954	4955	4956	4957	4958	4959	4960	4961	4962	4963	4964	4965	4966	4967	4968
27	4969	4970	4971	4972	4973	4974	4975	4976	4977	4978	4979	4980	4981	4982	4983	4984	4985	4986	4987	4988	4989	4990	4991	4992
28	4993	4994	4995	4996	4997	4998	4999	5000	5001	5002	5003	5004	5005	5006	5007	5008	5009	5010	5011	5012	5013	5014	5015	5016
29	5017	5018	5019	5020	5021	5022	5023	5024	5025	5026	5027	5028	5029	5030	5031	5032	5033	5034	5035	5036	5037	5038	5039	5040
30	5041	5042	5043	5044	5045	5046	5047	5048	5049	5050	5051	5052	5053	5054	5055	5056	5057	5058	5059	5060	5061	5062	5063	5064
31	5065	5066	5067	5068	5069	5070	5071	5072	5073	5074	5075	5076	5077	5078	5079	5080	5081	5082	5083	5084	5085	5086	5087	5088

MINIT

0-5	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-53	54-59
0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

BULAN OGOS

JAM

HARI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	5089	5090	5091	5092	5093	5094	5095	5096	5097	5098	5099	5100	5101	5102	5103	5104	5105	5106	5107	5108	5109	5110	5111	5112
2	5113	5114	5115	5116	5117	5118	5119	5120	5121	5122	5123	5124	5125	5126	5127	5128	5129	5130	5131	5132	5133	5134	5135	5136
3	5137	5138	5139	5140	5141	5142	5143	5144	5145	5146	5147	5148	5149	5150	5151	5152	5153	5154	5155	5156	5157	5158	5159	5160
4	5161	5162	5163	5164	5165	5166	5167	5168	5169	5170	5171	5172	5173	5174	5175	5176	5177	5178	5179	5180	5181	5182	5183	5184
5	5185	5186	5187	5188	5189	5190	5191	5192	5193	5194	5195	5196	5197	5198	5199	5200	5201	5202	5203	5204	5205	5206	5207	5208
6	5209	5210	5211	5212	5213	5214	5215	5216	5217	5218	5219	5220	5221	5222	5223	5224	5225	5226	5227	5228	5229	5230	5231	5232
7	5233	5234	5235	5236	5237	5238	5239	5240	5241	5242	5243	5244	5245	5246	5247	5248	5249	5250	5251	5252	5253	5254	5255	5256
8	5257	5258	5259	5260	5261	5262	5263	5264	5265	5266	5267	5268	5269	5270	5271	5272	5273	5274	5275	5276	5277	5278	5279	5280
9	5281	5282	5283	5284	5285	5286	5287	5288	5289	5290	5291	5292	5293	5294	5295	5296	5297	5298	5299	5300	5301	5302	5303	5304
10	5305	5306	5307	5308	5309	5310	5311	5312	5313	5314	5315	5316	5317	5318	5319	5320	5321	5322	5323	5324	5325	5326	5327	5328
11	5329	5330	5331	5332	5333	5334	5335	5336	5337	5338	5339	5340	5341	5342	5343	5344	5345	5346	5347	5348	5349	5350	5351	5352
12	5353	5354	5355	5356	5357	5358	5359	5360	5361	5362	5363	5364	5365	5366	5367	5368	5369	5370	5371	5372	5373	5374	5375	5376
13	5377	5378	5379	5380	5381	5382	5383	5384	5385	5386	5387	5388	5389	5390	5391	5392	5393	5394	5395	5396	5397	5398	5399	5400
14	5401	5402	5403	5404	5405	5406	5407	5408	5409	5410	5411	5412	5413	5414	5415	5416	5417	5418	5419	5420	5421	5422	5423	5424
15	5425	5426	5427	5428	5429	5430	5431	5432	5433	5434	5435	5436	5437	5438	5439	5440	5441	5442	5443	5444	5445	5446	5447	5448
16	5449	5450	5451	5452	5453	5454	5455	5456	5457	5458	5459	5460	5461	5462	5463	5464	5465	5466	5467	5468	5469	5470	5471	5472
17	5473	5474	5475	5476	5477	5478	5479	5480	5481	5482	5483	5484	5485	5486	5487	5488	5489	5490	5491	5492	5493	5494	5495	5496
18	5497	5498	5499	5500	5501	5502	5503	5504	5505	5506	5507	5508	5509	5510	5511	5512	5513	5514	5515	5516	5517	5518	5519	5520
19	5521	5522	5523	5524	5525	5526	5527	5528	5529	5530	5531	5532	5533	5534	5535	5536	5537	5538	5539	5540	5541	5542	5543	5544
20	5545	5546	5547	5548	5549	5550	5551	5552	5553	5554	5555	5556	5557	5558	5559	5560	5561	5562	5563	5564	5565	5566	5567	5568
21	5569	5570	5571	5572	5573	5574	5575	5576	5577	5578	5579	5580	5581	5582	5583	5584	5585	5586	5587	5588	5589	5590	5591	5592
22	5593	5594	5595	5596	5597	5598	5599	5600	5601	5602	5603	5604	5605	5606	5607	5608	5609	5610	5611	5612	5613	5614	5615	5616
23	5617	5618	5619	5620	5621	5622	5623	5624	5625	5626	5627	5628	5629	5630	5631	5632	5633	5634	5635	5636	5637	5638	5639	5640
24	5641	5642	5643	5644	5645	5646	5647	5648	5649	5650	5651	5652	5653	5654	5655	5656	5657	5658	5659	5660	5661	5662	5663	5664
25	5665	5666	5667	5668	5669	5670	5671	5672	5673	5674	5675	5676	5677	5678	5679	5680	5681	5682	5683	5684	5685	5686	5687	5688
26	5689	5690	5691	5692	5693	5694	5695	5696	5697	5698	5699	5700	5701	5702	5703	5704	5705	5706	5707	5708	5709	5710	5711	5712
27	5713	5714	5715	5716	5717	5718	5719	5720	5721	5722	5723	5724	5725	5726	5727	5728	5729	5730	5731	5732	5733	5734	5735	5736
28	5737	5738	5739	5740	5741	5742	5743	5744	5745	5746	5747	5748	5749	5750	5751	5752	5753	5754	5755	5756	5757	5758	5759	5760
29	5761	5762	5763	5764	5765	5766	5767	5768	5769	5770	5771	5772	5773	5774	5775	5776	5777	5778	5779	5780	5781	5782	5783	5784
30	5785	5786	5787	5788	5789	5790	5791	5792	5793	5794	5795	5796	5797	5798	5799	5800	5801	5802	5803	5804	5805	5806	5807	5808
31	5809	5810	5811	5812	5813	5814	5815	5816	5817	5818	5819	5820	5821	5822	5823	5824	5825	5826	5827	5828	5829	5830	5831	5832

MINIT

0-5	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-53	54-59
0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

BULAN SEPTEMBER

HARI	JAM																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	5833	5834	5835	5836	5837	5838	5839	5840	5841	5842	5843	5844	5845	5846	5847	5848	5849	5850	5851	5852	5853	5854	5855	5856
2	5857	5858	5859	5860	5861	5862	5863	5864	5865	5866	5867	5868	5869	5870	5871	5872	5873	5874	5875	5876	5877	5878	5879	5880
3	5881	5882	5883	5884	5885	5886	5887	5888	5889	5890	5891	5892	5893	5894	5895	5896	5897	5898	5899	5900	5901	5902	5903	5904
4	5905	5906	5907	5908	5909	5910	5911	5912	5913	5914	5915	5916	5917	5918	5919	5920	5921	5922	5923	5924	5925	5926	5927	5928
5	5929	5930	5931	5932	5933	5934	5935	5936	5937	5938	5939	5940	5941	5942	5943	5944	5945	5946	5947	5948	5949	5950	5951	5952
6	5953	5954	5955	5956	5957	5958	5959	5960	5961	5962	5963	5964	5965	5966	5967	5968	5969	5970	5971	5972	5973	5974	5975	5976
7	5977	5978	5979	5980	5981	5982	5983	5984	5985	5986	5987	5988	5989	5990	5991	5992	5993	5994	5996	5996	5997	5998	5999	6000
8	6001	6002	6003	6004	6005	6006	6007	6008	6009	6010	6011	6012	6013	6014	6015	6016	6017	6018	6019	6020	6021	6022	6023	6024
9	6025	6026	6027	6028	6029	6030	6031	6032	6033	6034	6035	6036	6037	6038	6039	6040	6041	6042	6043	6044	6045	6046	6047	6048
10	6049	6050	6051	6052	6053	6054	6055	6056	6057	6058	6059	6060	6061	6062	6063	6064	6065	6066	6067	6068	6069	6070	6071	6072
11	6073	6074	6075	6076	6077	6078	6079	6080	6081	6082	6083	6084	6085	6086	6087	6088	6089	6090	6091	6092	6093	6094	6095	6096
12	6097	6098	6099	6100	6101	6102	6103	6104	6105	6106	6107	6108	6109	6110	6111	6112	6113	6114	6115	6116	6117	6118	6119	6120
13	6121	6122	6123	6124	6125	6126	6127	6128	6129	6130	6131	6132	6133	6134	6135	6136	6137	6138	6139	6140	6141	6142	6143	6144
14	6145	6146	6147	6148	6149	6150	6151	6152	6153	6154	6155	6156	6157	6158	6159	6160	6161	6162	6163	6164	6165	6166	6167	6168
15	6169	6170	6171	6172	6173	6174	6175	6176	6177	6178	6179	6180	6181	6182	6183	6184	6185	6186	6187	6188	6189	6190	6191	6192
16	6193	6194	6195	6196	6197	6198	6199	6200	6201	6202	6203	6204	6205	6206	6207	6208	6209	6210	6211	6212	6213	6214	6215	6216
17	6217	6218	6219	6220	6221	6222	6223	6224	6225	6226	6227	6228	6229	6230	6231	6232	6233	6234	6235	6236	6237	6238	6239	6240
18	6241	6242	6243	6244	6245	6246	6247	6248	6249	6250	6251	6252	6253	6254	6255	6256	6257	6258	6259	6260	6261	6262	6263	6264
19	6265	6266	6267	6268	6269	6270	6271	6272	6273	6274	6275	6276	6277	6278	6279	6280	6281	6282	6283	6284	6285	6286	6287	6288
20	6289	6290	6291	6292	6293	6294	6295	6296	6297	6298	6299	6300	6301	6302	6303	6304	6305	6306	6307	6308	6309	6310	6311	6312
21	6313	6314	6315	6316	6317	6318	6319	6320	6321	6322	6323	6324	6325	6326	6327	6328	6329	6330	6331	6332	6333	6334	6335	6336
22	6337	6338	6339	6340	6341	6342	6343	6344	6345	6346	6347	6348	6349	6350	6351	6352	6353	6354	6355	6356	6357	6358	6359	6360
23	6361	6362	6363	6364	6365	6366	6367	6368	6369	6370	6371	6372	6373	6374	6375	6376	6377	6378	6379	6380	6381	6382	6383	6384
24	6385	6386	6387	6388	6389	6390	6391	6392	6393	6394	6395	6396	6397	6398	6399	6400	6401	6402	6403	6404	6405	6406	6407	6408
25	6409	6410	6411	6412	6413	6414	6415	6416	6417	6418	6419	6420	6421	6422	6423	6424	6425	6426	6427	6428	6429	6430	6431	6432
26	6433	6434	6435	6436	6437	6438	6439	6440	6441	6442	6443	6444	6445	6446	6447	6448	6449	6450	6451	6452	6453	6454	6455	6456
27	6457	6458	6459	6460	6461	6462	6463	6464	6465	6466	6467	6468	6469	6470	6471	6472	6473	6474	6475	6476	6477	6478	6479	6480
28	6481	6482	6483	6484	6485	6486	6487	6488	6489	6490	6491	6492	6493	6494	6495	6496	6497	6498	6499	6500	6501	6502	6503	6504
29	6505	6506	6507	6508	6509	6510	6511	6512	6513	6514	6515	6516	6517	6518	6519	6520	6521	6522	6523	6524	6525	6526	6527	6528
30	6529	6530	6531	6532	6533	6534	6535	6536	6537	6538	6539	6540	6541	6542	6543	6544	6545	6546	6547	6548	6549	6550	6551	6552

MINIT

0-5	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-53	54-59
0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

BULAN OKTOBER

JAM

HARI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	6553	6554	6555	6556	6557	6558	6559	6560	6561	6562	6563	6564	6565	6566	6567	6568	6569	6570	6571	6572	6573	6574	6575	6576
2	6577	6578	6579	6580	6581	6582	6583	6584	6585	6586	6587	6588	6589	6590	6591	6592	6593	6594	6595	6596	6597	6598	6599	6600
3	6601	6602	6603	6604	6605	6606	6607	6608	6609	6610	6611	6612	6613	6614	6615	6616	6617	6618	6619	6620	6621	6622	6623	6624
4	6625	6626	6627	6628	6629	6630	6631	6632	6633	6634	6635	6636	6637	6638	6639	6640	6641	6642	6643	6644	6645	6646	6647	6648
5	6649	6650	6651	6652	6653	6654	6655	6656	6657	6658	6659	6660	6661	6662	6663	6664	6665	6666	6667	6668	6669	6670	6671	6672
6	6673	6674	6675	6676	6677	6678	6679	6680	6681	6682	6683	6684	6685	6686	6687	6688	6689	6690	6691	6692	6693	6694	6695	6696
7	6697	6698	6699	6700	6701	6702	6703	6704	6705	6706	6707	6708	6709	6710	6711	6712	6713	6714	6715	6716	6717	6718	6719	6720
8	6721	6722	6723	6724	6725	6726	6727	6728	6729	6730	6731	6732	6733	6734	6735	6736	6737	6738	6739	6740	6741	6742	6743	6744
9	6745	6746	6747	6748	6749	6750	6751	6752	6753	6754	6755	6756	6757	6758	6759	6760	6761	6762	6763	6764	6765	6766	6767	6768
10	6769	6770	6771	6772	6773	6774	6775	6776	6777	6778	6779	6780	6781	6782	6783	6784	6785	6786	6787	6788	6789	6790	6791	6792
11	6793	6794	6795	6796	6797	6798	6799	6800	6801	6802	6803	6804	6805	6806	6807	6808	6809	6810	6811	6812	6813	6814	6815	6816
12	6817	6818	6819	6820	6821	6822	6823	6824	6825	6826	6827	6828	6829	6830	6831	6832	6833	6834	6835	6836	6837	6838	6839	6840
13	6841	6842	6843	6844	6845	6846	6847	6848	6849	6850	6851	6852	6853	6854	6855	6856	6857	6858	6859	6860	6861	6862	6863	6864
14	6865	6866	6867	6868	6869	6870	6871	6872	6873	6874	6875	6876	6877	6878	6879	6880	6881	6882	6883	6884	6885	6886	6887	6888
15	6889	6890	6891	6892	6893	6894	6895	6896	6897	6898	6899	6900	6901	6902	6903	6904	6905	6906	6907	6908	6909	6910	6911	6912
16	6913	6914	6915	6916	6917	6918	6919	6920	6921	6922	6923	6924	6925	6926	6927	6928	6929	6930	6931	6932	6933	6934	6935	6936
17	6937	6938	6939	6940	6941	6942	6943	6944	6945	6946	6947	6948	6949	6950	6951	6952	6953	6954	6955	6956	6957	6958	6959	6960
18	6961	6962	6963	6964	6965	6966	6967	6968	6969	6970	6971	6972	6973	6974	6975	6976	6977	6978	6979	6980	6981	6982	6983	6984
19	6985	6986	6987	6988	6989	6890	6991	6992	6993	6994	6995	6996	6997	6998	6999	7000	7001	7002	7003	7004	7005	7006	7007	7008
20	7009	7010	7011	7012	7013	7014	7015	7016	7017	7018	7019	7020	7021	7022	7023	7024	7025	7026	7027	7028	7029	7030	7031	7032
21	7033	7034	7035	7036	7037	7038	7039	7040	7041	7042	7043	7044	7045	7046	7047	7048	7049	7050	7051	7052	7053	7054	7055	7056
22	7057	7058	7059	7060	7061	7062	7063	7064	7065	7066	7067	7068	7069	7070	7071	7072	7073	7074	7075	7076	7077	7078	7079	7080
23	7081	7082	7083	7084	7085	7086	7087	7088	7089	7090	7091	7092	7093	7094	7095	7096	7097	7098	7099	7100	7101	7102	7103	7104
24	7105	7106	7107	7108	7109	7110	7111	7112	7113	7114	7115	7116	7117	7118	7119	7120	7121	7122	7123	7124	7125	7126	7127	7128
25	7129	7130	7131	7132	7133	7134	7135	7136	7137	7138	7139	7140	7141	7142	7143	7144	7145	7146	7147	7148	7149	7150	7151	7152
26	7153	7154	7155	7156	7157	7158	7159	7160	7161	7162	7163	7164	7165	7166	7167	7168	7169	7170	7171	7172	7173	7174	7175	7176
27	7177	7178	7179	7180	7181	7182	7183	7184	7185	7186	7187	7188	7189	7190	7191	7192	7193	7194	7195	7196	7197	7198	7199	7200
28	7201	7202	7203	7204	7205	7206	7207	7208	7209	7210	7211	7212	7213	7214	7215	7216	7217	7218	7219	7220	7221	7222	7223	7224
29	7225	7226	7227	7228	7229	7230	7231	7232	7233	7234	7235	7236	7237	7238	7239	7240	7241	7242	7243	7244	7245	7246	7247	7248
30	7249	7250	7251	7252	7253	7254	7255	7256	7257	7258	7259	7260	7261	7262	7263	7264	7265	7266	7267	7268	7269	7270	7271	7272
31	7273	7274	7275	7276	7277	7278	7279	7280	7281	7282	7283	7284	7285	7286	7287	7288	7289	7290	7291	7292	7293	7294	7295	7296

MINIT

0-5	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-53	54-59
0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9

BULAN DESEMBER																																																											
JAM																																																											
HARI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																																			
1	8017	8018	8019	8020	8021	8022	8023	8024	8025	8026	8027	8028	8029	8030	8031	8032	8033	8034	8035	8036	8037	8038	8039	8040																																			
2	8041	8042	8043	8044	8045	8046	8047	8048	8049	8050	8051	8052	8053	8054	8055	8056	8057	8058	8059	8060	8061	8062	8063	8064																																			
3	8065	8066	8067	8068	8069	8070	8071	8072	8073	8074	8075	8076	8077	8078	8079	8080	8081	8082	8083	8084	8085	8086	8087	8088																																			
4	8089	8090	8091	8092	8093	8094	8095	8096	8097	8098	8099	8100	8101	8102	8103	8104	8105	8106	8107	8108	8109	8110	8111	8112																																			
5	8113	8114	8115	8116	8117	8118	8119	8120	8121	8122	8123	8124	8125	8126	8127	8128	8129	8130	8131	8132	8133	8134	8135	8136																																			
6	8137	8138	8139	8140	8141	8142	8143	8144	8145	8146	8147	8148	8149	8150	8151	8152	8153	8154	8155	8156	8157	8158	8159	8160																																			
7	8161	8162	8163	8164	8165	8166	8167	8168	8169	8170	8171	8172	8173	8174	8175	8176	8177	8178	8179	8180	8181	8182	8183	8184																																			
8	8185	8186	8187	8188	8189	8190	8191	8192	8193	8194	8195	8196	8197	8198	8199	8200	8201	8202	8203	8204	8205	8206	8207	8208																																			
9	8209	8210	8211	8212	8213	8214	8215	8216	8217	8218	8219	8220	8221	8222	8223	8224	8225	8226	8227	8228	8229	8230	8231	8232																																			
10	8233	8234	8235	8236	8237	8238	8239	8240	8241	8242	8243	8244	8245	8246	8247	8248	8249	8250	8251	8252	8253	8254	8255	8256																																			
11	8257	8258	8259	8260	8261	8262	8263	8264	8265	8266	8267	8268	8269	8270	8271	8272	8273	8274	8275	8276	8277	8278	8279	8280																																			
12	8281	8282	8283	8284	8285	8286	8287	8288	8289	8290	8291	8292	8293	8294	8295	8296	8297	8298	8299	8300	8301	8302	8303	8304																																			
13	8305	8306	8307	8308	8309	8310	8311	8312	8313	8314	8315	8316	8317	8318	8319	8320	8321	8322	8323	8324	8325	8326	8327	8328																																			
14	8329	8330	8331	8332	8333	8334	8335	8336	8337	8338	8339	8340	8341	8342	8343	8344	8345	8346	8347	8348	8349	8350	8351	8352																																			
15	8353	8354	8355	8356	8357	8358	8359	8360	8361	8362	8363	8364	8365	8366	8367	8368	8369	8370	8371	8372	8373	8374	8375	8376																																			
16	8377	8378	8379	8380	8381	8382	8383	8384	8385	8386	8387	8388	8389	8390	8391	8392	8393	8394	8395	8396	8397	8398	8399	8400																																			
17	8401	8402	8403	8404	8405	8406	8407	8408	8409	8410	8411	8412	8413	8414	8415	8416	8417	8418	8419	8420	8421	8422	8423	8424																																			
18	8425	8426	8427	8428	8429	8430	8431	8432	8433	8434	8435	8436	8437	8438	8439	8440	8441	8442	8443	8444	8445	8446	8447	8448																																			
19	8449	8450	8451	8452	8453	8454	8455	8456	8457	8458	8459	8460	8461	8462	8463	8464	8465	8466	8467	8468	8469	8470	8471	8472																																			
20	8473	8474	8475	8476	8477	8478	8479	8480	8481	8482	8483	8484	8485	8486	8487	8488	8489	8490	8491	8492	8493	8494	8495	8496																																			
21	8497	8498	8499	8500	8501	8502	8503	8504	8505	8506	8507	8508	8509	8510	8511	8512	8513	8514	8515	8516	8517	8518	8519	8520																																			
22	8521	8522	8523	8524	8525	8526	8527	8528	8529	8530	8531	8532	8533	8534	8535	8536	8537	8538	8539	8540	8542	8542	8543	8544																																			
23	8545	8546	8547	8548	8549	8550	8551	8552	8553	8554	8555	8556	8557	8558	8559	8560	8561	8562	8563	8564	8565	8566	8567	8568																																			
24	8569	8570	8571	8572	8573	8574	8575	8576	8577	8578	8579	8580	8581	8582	8583	8584	8585	8586	8587	8588	8589	8590	8591	8592																																			
25	8593	8594	8595	8596	8597	8598	8599	8600	8601	8602	8603	8604	8605	8606	8607	8608	8609	8610	8611	8612	8613	8614	8615	8616																																			
26	8617	8618	8619	8620	8621	8622	8623	8624	8625	8626	8627	8628	8629	8630	8631	8632	8633	8634	8635	8636	8637	8638	8639	8640																																			
27	8641	8642	8643	8644	8645	8646	8647	8648	8649	8650	8651	8652	8653	8654	8655	8656	8657	8658	8659	8660	8661	8662	8663	8664																																			
28	8665	8666	8667	8668	8669	8670	8671	8672	8673	8674	8675	8676	8677	8678	8679	8680	8681	8682	8683	8684	8685	8686	8687	8688																																			
29	8689	8690	8691	8692	8693	8694	8695	8696	8697	8698	8699	8700	8701	8702	8703	8704	8705	8706	8707	8708	8709	8710	8711	8712																																			
30	8713	8714	8715	8716	8717	8718	8719	8720	8721	8722	8723	8724	8725	8726	8727	8728	8729	8730	8731	8732	8733	8734	8735	8736																																			
31	8737	8738	8739	8740	8741	8742	8743	8744	8745	8746	8747	8748	8749	8750	8751	8752	8753	8754	8755	8756	8757	8758	8759	8760																																			
MINIT																																																											
0-5						6-11						12-17						18-23						24-29						30-35						36-41						42-47						48-53						54-59					
0.0						0.1						0.2						0.3						0.4						0.5						0.6						0.7						0.8						0.9					