User Manual for North Island Brown "Chick Timer" transmitters V3.4

1.0 Background

Version 3.4 "Chick Timer" transmitters have been developed specifically for the NIB kiwi species.

The "Chick Timer" developed for NIB kiwi has been designed to detect the start and end of incubation, hatch of the first chick and the point at which the risk of the male deserting the nest after a successful hatch starts to increase. The transmitters output the number of days since the start or end of incubation and the number of days since hatch and the number of days since the desertion risk started to rise. In addition there are a further 5 outputs, a description of these outputs is provided below.

2.0 Turning a transmitter on or off

Over view

The radio output of a transmitter can be turned on and off using a magnet. At the time of turn on the user may set the time of day in hours after midnight, but this is not compulsory. If the time of day is set correctly then the transmitter will automatically adjust itself so that it rolls over each 24 hour period at 0800 in the morning. If the time is not set at turn on then the transmitter will roll over the 24 hour periods in synch with the time that the transmitter was turned on. Setting the time at turn on means that transmitters monitored after 0800 in the morning will tell you what happened "last night" and it will not be necessary to wait until later in the day (for the time of turn on) for the transmitter to role over the 24hr period.

When the Egg Timer is turned on it will start in the incubating state. In theory this should be impossible, since transmitters are normally changed outside the breeding season and a brood patch and or egg would be noticed if the male was incubating. After 8 days the transmitter will have built an activity profile for the bird and should switch to not incubating. However it is possible that the bird is incubating and in this case it will not switch out of the initial incubating state. If this happens (in the case of simple or no time set turn on) the day counter will count up from the initialised value 5,6 representing software version 3.4 (see section 4.3 Working out the number of days). If the time is set at turn on then the days since hatch value 5,6 will be cleared to zero i.e. 2,2 at the end of the first partial day and count up from there.

Turn on with no time set

A magnet is used to turn the transmitters on and off. When a magnet is placed in the correct location the transmitter will sound a tone (heard on a suitable receiver) for approximately 1 second. The magnet must be held in place until the continuous tone turns itself off. To complete the turn on or off sequence the magnet must then be moved away from the transmitter within a further 2 seconds after the tone turns itself off. This is a "simple" turn on and will start the transmitter with no time set, and under these conditions the 24 hour days will role over every day at the time that the transmitter was turned on.

The turn on or off sequence is aborted if the magnet is not held in place long enough for the continuous tone to turn off by itself. The turn on or off sequence is also aborted if the magnet is not moved away within 2 seconds after the continuous tone turns off.

If the time of turn on is not set then the hatch counter slot will be set to zero i.e. 2,2 and the days since change of state slot will hold the software version number. The software version number will persist (and increment up one, at each full 24 hour period roll over) and is only reset when the transmitter changes state to not nesting.

Turn on with time set

If the time is to be set the procedure is to start off as above but rather than moving the magnet away at the end permanently, move the magnet away briefly and return it to the transmitter. The transmitter will start to output pulses at a rate of one every 1.5 seconds. Each pulse represents one hour after midnight. Count all the pulses as heard and remove the magnet when the count gets to that desired. If the time of turn on was 3pm the time would be set as 15 hours after midnight, therefore requiring the magnet to be held in place until 15 pulses had been counted. Once the required number of pulses has been heard the magnet can be removed and the turn on sequence is complete.

If the time set function is used a partial (non 24 hour) first day will be created, any activity that occurs during this partial day is ignored. Ie if a transmitter is turned on at 3pm the first partial day will be 17 hours long and the first full day will be from 0800 the next morning. If a transmitter is turned on at midnight then the time should be set as 24 hours after midnight since it is not possible to set zero hours after midnight.

Checking the time set after turn on

To check the time that has been set, the user may listen to the outputs. Immediately after turn on the transmitter will output 10 pulses at a rate of 48 pulses per minute (one pulse every 1.25 seconds) the output sequence will then start and be transmitted to the user in the format described later. The first number set is for days since change of state and the second for days since hatch. After turn on these two output slots are "hijacked" and are used to transmit the software version number and the time of turn on that has been set. The version number is inserted in the days since change of state slot and the time of turn on is inserted in the days since hatch slot. If the time is not set at turn on then zero will be outputted in the days since hatch slot. The time of turn on is cleared at the end of the first partial day along with the software version number to zero. The zeroed days since change of state counter increments up one, at each full 24 hour period roll over and is reset in the normal way when the transmitter changes state to not nesting.

If a mistake is made setting the time, turn the transmitter off and try again, it's fun you'll enjoy it.

3.0 Pulse rates

"Chick Timer" transmitters can output 4 different pulse rates.

30ppm = not incubating
48ppm = incubating
Double pulsing = desertion alert
80ppm = mortality

When the transmitter is double pulsing pulses come in sets of two. These sets of two pulses are repeated approximately every 2 seconds. The net effect is; beep beep beep beep beep beep. The basic number output structure when double pulsing is identical to that of the other pules rates (i.e. each set of two pulses is equivalent to one pulse).

4.0 Outputs

4.1 Over view and explanations

The not incubating, incubating, desertion alert and mortality pulse rates are broken every 10 minutes by a series of 8 outputs as described in the following list.

1. **Days since change of state**.
2. **Days since hatch.**
3. **Days since desertion alert was triggered.**
4. **Time of emergence.**
5. **Weeks of life remaining for the transmitter.**
6. **Activity Yesterday**.
7. **Activity 2 days ago**.
8. **True mean of the last 4 days.**

The transmitters will not start to give accurate information about the bird until at least 8 days after turn on, by which time the activity profile for the bird will have been confirmed.

Days since change of state output

The days since change of state outputs the number of days since the change of state to not incubating, incubating and mortality. The desertion alert state is a special case. The pulse rate changes to double pulsing but the state is still technically that of incubation so in this case the days since change of state will continue to report days since the start of incubation.

Days since hatch output

The days since hatch counter will remain at zero (i.e. 2,2) throughout the incubation period until a hatch is detected, at that point it will change to 2 days and count up one day at a time from there. The hatch counter value continues to count up one day at a time and is not cleared until the start of a new incubation, this means that if a bird completes a hatch and then changes to the state not incubating, it is possible to retrieve the information and form an appropriate management plan.

Days since desertion alert was triggered

The Days since desertion alert will be triggered when the activity profile of the bird implies that he maybe starting to increase his night-time feeding activity prior to possible desertion of the nest. This normally occurs once all viable eggs have successfully finished hatching and the sacrifice in night-time feeding activity associated with brooding chicks in the nest is starting to end. The desertion alert is cleared at the start of a new incubation as described above for the days since hatch output.

Time of emergence output

Reports the time in hours before now that the bird last emerged for a period of feeding activity. If a transmitter were monitored at 0900 and time of emergence was reported as 2,9 (ie 7 hours ago) it is implying that the bird emerged at ~ 0200. The time of emergence output counts up 1 hour at a time.

Weeks of life remaining output

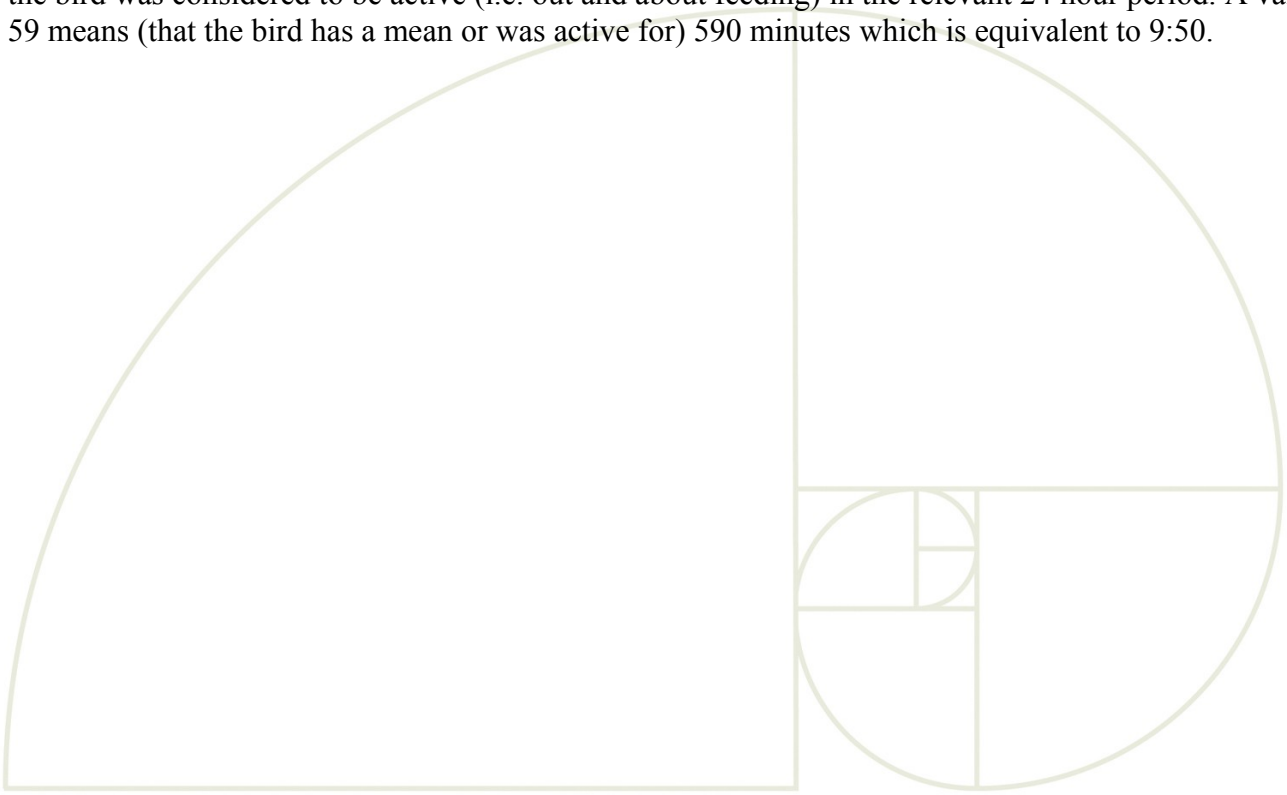
Is an estimate of the projected time remaining in weeks before the battery has the potential to go flat. It may be usefully as a guide to help prioritise transmitter changes, or to assess the appropriate action should a bird be incubating near the end of the transmitters expected life.

The transmitter will continually adjust the projected time remaining and despite starting at 52 weeks is likely to take longer than 52 weeks to count down to zero. However a transmitter that spends some time in mortality may count down to zero in less than 52 weeks because of the higher pulse rate.

The transmitter will always remember how much time is remaining even if turned off and on multiple times and will therefore automatically correct for situations where transmitters have been left on by accident prior to fit.

Activity and mean outputs

The mean activity and previous days of activity are output as the number of minutes divided by 10 that the bird was considered to be active (i.e. out and about feeding) in the relevant 24 hour period. A value of 59 means (that the bird has a mean or was active for) 590 minutes which is equivalent to 9:50.



4.2 Listening to the outputs

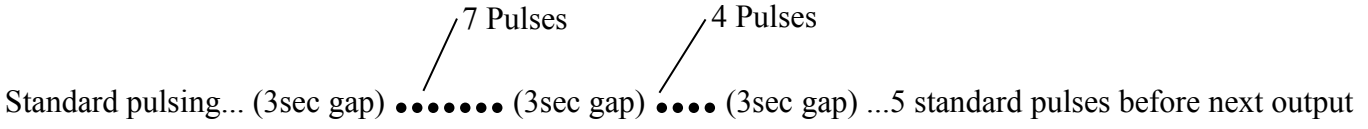
Listening to the output sounds a lot worse on paper than it is in reality, so read to the end of the instructions to get the overall picture and then have a go. If you get stuck phone Wildtech for assistance on **027 672 4856 or 06 877 1563**

Overall scheme

During normal operation the day counter outputs start exactly every 10 minutes, based on the turn on time (even if the time of day has been set). i.e. If you turn on at 15:39:13, the next output sequence will start at 15:49:13 etc....There are 12 outputs, each output has two components tens and units (see detailed scheme below).

Detailed scheme

Using the first output for days since change of state as an example



To interpret the days;

1. Wait for the 3 second gap.
2. Count the pulses.
3. Wait for the three second gap
4. Count the pulses.
5. Wait for the three second gap.
6. Write down the two numbers obtained.

Following that five standard pulses (at either 30, 48 Double pulsing or 80ppm) will be heard before the next output (for days since hatch) comes in exactly the same format.

4.2 Recording the information

When recording information in the field it is recommended that you write down what you hear and work out the answers when you get back to base. Using a NIB "Chick Timer" just after turn on with the time of turn on set to 1pm as an example the following should be recorded.

48ppm/5,6/3,5/2,2/2,2/7,4/6,4/6,4/6,4

48 is the pulse rate for incubating and the comma separated numbers are the tens and units for each output, some of the numbers are pre-initialised values. After the first full 24 hour day the outputs should be quite different and more so after 8 days.

4.3 Working out the number of days

The example above gives the following result, 5 pulses followed by 6 pulses.

To obtain the true decimal values for the number of days it is necessary to subtract 2 from each individual number. This yields **3** and **4**. The first number is the number of tens and the second number the number of units, therefore the final answer is 34 **days since the start of incubation**.

The number of days output immediately after turn on is relaying the software version. For NIB "Chick Timer" V3.4 transmitters this should be 5,6 i.e. Version 3.4.

If a bird is incubating when the transmitter is fitted the "Chick Timer" will not switch out of the initial incubating state. If this happens the day counter will count up from the initialised value 5,6 representing the software version until the bird convinces the transmitter that it is not incubating. If however the time was set at the time of turn on then the software version will be cleared at the end of the first partial day as described earlier. In either case the timing can not be relied upon since the transmitter was not able to detect the start of incubation.

Note
The maximum number output is 256 days. In such a case the output for days will give 27 pulses followed by 8. After 256 days the counter roles over and restarts from 1. Only the most determined non breeders are expected to test this feature.

4.4 Working out the time of emergence

The example above gives the following result, 2 pulses followed by 2 pulses, which is not very interesting, so for the purposes of this exercise we'll assume that the time of emergence output has been recorded as 5,8 at midday. To obtain the decimal value for time of emergence in hours before now it is necessary to subtract 2 from each individual number. 5,8 with 2 subtracted from each number gives 3 then 6. 3 is the number of 10s and 6 is the number of units (i.e. the bird last emerged 36 hours before now). This implies that the bird did not get off the nest last night for long enough to trigger emergence and that the last time he did got up was approximately midnight the night before.

4.5 Working out the number of weeks remaining

The example above gives the following result, 7 pulses followed by 4 pulses.

To obtain the true decimal values for the weeks remaining it is necessary to subtract 2 from each individual number. This yields **5** and **2**. The first number is the number of tens and the second number the number of units, therefore the final answer is 52 weeks remaining.

4.6 Working out the activity or mean

The example above gives (coincidentally) the following result, 6 pulses followed by 4 pulses for both the activity and true 4 day mean.

To obtain the true decimal values for the activity or mean it is necessary to subtract 2 from each individual number. This yields **4** and **2**. The first number is the number of tens and the second number the number of units, therefore the final answer is 42. This it the number of minutes divided by 10 so the activity or mean is 420 minutes ie 7:00.

5.0 Mortality

The transmitters will also output the number of days since the start of mortality. Mortality "latches" and will be activated after 24 hours of zero movement. The timing output gives the number of days since the last movement.

The **time since death** output will keep counting every day until the transmitter is turned off and restarted. The mortality pulse rate is set at 80 pulses per minute.

It should be noted that death may not necessarily result in zero movement of the transmitter, the carcase can be moved intermittently, presumably by scavengers for a number of days (and in some cases in the region of 2 weeks). Consequently mortality cannot be relied upon as a true measure of time since death.

If a mortality signal is heard with no number outputs the transmitter is likely to have a hardware fault that (may go away) but is more likely to become chronic and result in transmitter failure. In such a case it is recommended that the transmitter be replaced immediately. However other forms of management may also be appropriate depending on the circumstances. Eg choosing to mark the nest of a known incubating bird rather than disturbing it so that it can be found in the event the transmitter fails.

5.1 Listening to the number output

The output format in mortality is similar to that in normal operation the only difference is that all the pulses will sound fast. The start of the output sequence will be at the same time as normal. **If you get stuck leave your transmitter going** and phone Wildtech for assistance on **027 672 4856 or (06) 877 1563**.

When in mortality the days since change of state output will tell you how many days since mortality started. If the day counter was giving 2,9 then the time since death (or more accurately the time since the transmitter stopped moving) would be 7 days.

Note

The maximum number output is 256 days. In such a case the output for days would have given 27 pulses followed by 8. After 256 days the counter roles over and restarts from 1. However mortality pulse rates are approximately double the standard output pulse rates. Consequently it is unlikely the output will get to 256 days before the transmitters battery goes flat.