# ALGE-SPORTS-TIMING

TIMER MODEL S3

The timer S3 was developed on the basis of the most recent advances in microelectronics. By using a single chip microcomputer it was possible to integrate two electronic timers with 12 memories each and many extras into this convenient device.

Owing to the 8 selectable operating modes, to the aforementioned two timers with their 12 memory locations, this timer is suitable for practically all kinds of timing, particularly since it is possible to connect a printer and a large display board.

As with all our products, we have placed the upmost emphasis on simple operation. These operating instructions will help you get familiar with the timer S3 very rapidly.
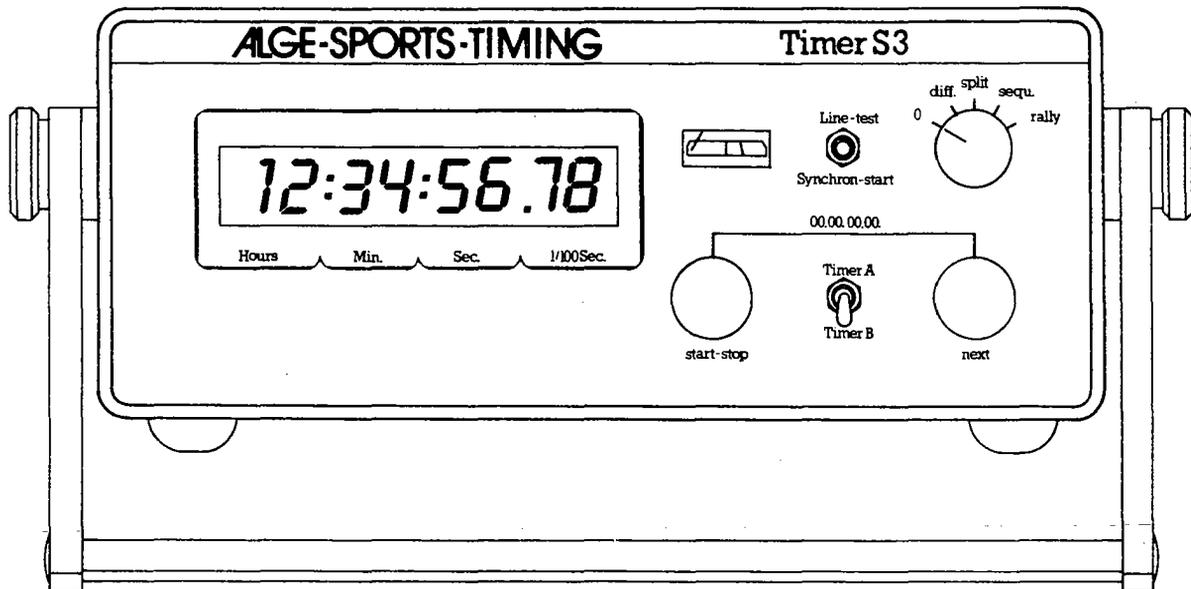
Operation elements and connections
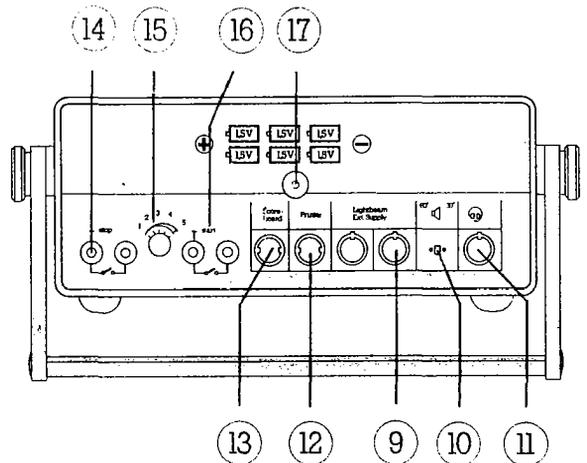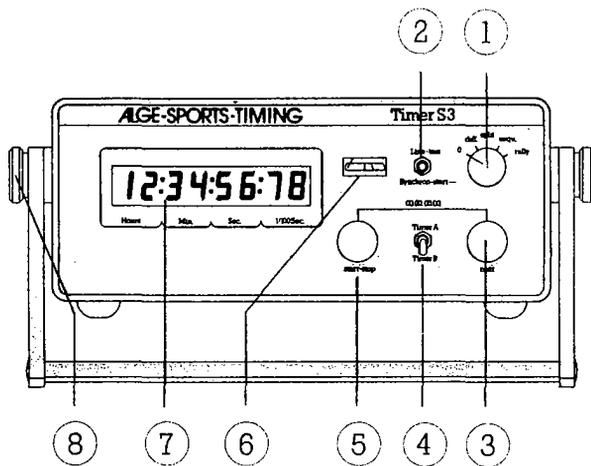
① On-Off switch combined with mode selector switch.

② Selector toggle switch for testing the line and sync start.

③ Recall button for stored times with additional functions as indicated in instruction manual.

④ Toggle-switch Timer A – Timer B.

⑤ Start-Stop key with additional functions as indicated in instruction manual.

③+⑤ By simultaneously pushing keys 3 + 5 the display as well as the preselected Timer are set at zero (unless unit is operated in the Differential Time mode).
As long as both keys are pressed down, the display will show only number eight's, to allow checking of all the display's segments.

⑥ Meter for monitoring power supply, adjustment of light barrier, and conductive condition of the start-to-finishing cable.

⑦ Eight-digit liquid crystal time-display in hours, minutes, seconds, and hundredths of seconds. While time is running, the hundredths of seconds are not displayed.

⑧ Knurled screws for loosening and fixing the handle.

⑨ Two (identical) DIN recepticals connected in parallel allowing light barrier (ALGE Light Barrier RLS 1), external power supply (ALGE Battery Charger), and possibly other timers (e.g. ALGE Timer S 1 or S 1-II or S 3) to be connected.

⑩ Outlet recepticals for count-down loud-speaker; by turning the socket by 180 Degrees starting intervals of 30 seconds and 60 seconds can be selected.
NOTE: Operational in the Differential Time mode only.

⑪ Connection for speaking device (Head-set/ Microphone Set K 158).

⑫ Output for Printer P 3.

⑬ Output for one ALGE Display Board GAZ. By turning the switch by 180 degrees you can either show the running time (as on the display) or just the time as clocked.

⑭ Bannana recepticals for manual key ALGE Reflection Light Barrier RLS 1/E or for clocking intermediate or finishing time.

⑮ Five-step revolving switch for selecting delay time (2 m sec./30 m sec./120 m sec./1 sec./ 2 sec.)

⑯ Bannana Recepticals for starting device with shielded operating contact (closing contact) for starting and clocking the time at the start (e. g. ALGE Starting Gate STS 3).
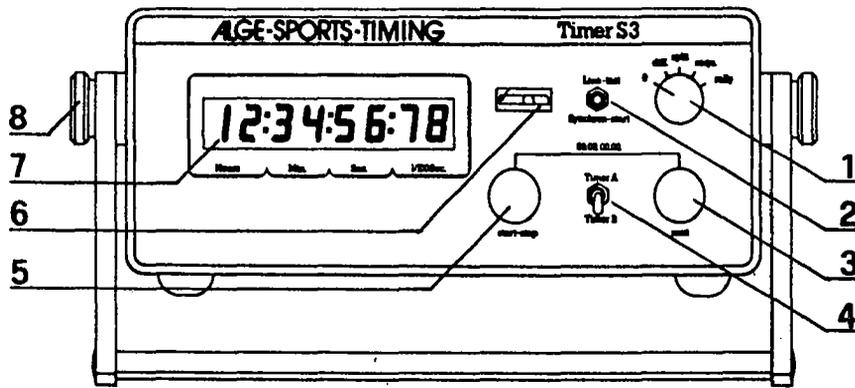
⑰ Hand nut for fixing the cover of the battery container.

This manual is devided into three parts.

PART I   a)   Operating elements and conncections.

1 = On-off switch combined with operating mode selector switch.
2 = Center off toggle switch for line test and synchronous start.
3 = Rejoin button for stored times with additional functions as in
     instructions.
4 = Selector switch timer A - timer B.
5 = Start-stop button with additional functions as in instructions.
3+5= By simultaneously pressing buttons 3 and 5, the preselected timer
     is set to zero (not with the operating mode "difference" however).
     The display shows a row of eights as long as the two buttons are
     kept pressed so that all segments of the digits can be checked.
6 = Level meter for monitoring the power supply, the photoelectric
     cell alignment and the line status of the start/finish line.
7 = Eight digit liquid crystal display in hours, minutes seconds and
     hundredths of a second. With running time, the hundredths of a
     second are blanked out.
8 = Thumbscrews for bale adjustment.
9 = Two parallel connected 5 pin DIN recepticals for photoelectric
     cell (RLS1), an external power source (ALGE charger or external
     12V battery).
10 = Output for loundspeaker. The start interval can be set to 30"
     or 60" by turning the plug 180 degrees. Please note: Functions
     only in the "difference" and "countdown clock" mode.
11 = Output for telephone headset K158.
12 = Output for printer P3.
13 = Output for ALGE "GAZ" display board. By turning the plug 180°
     it is possible to show either the running time (as on the timer
     display) or only the stopped time.
14 = Banana plug connection for manual switch or RLS1/E for stop or
     intermediate time .
15 = Potentiometer for setting the delay time, with five levels
     (2 msec/120 msec/1 sec/2 sec).
16 = Banana plug connection for a start facility with normally open
     contact for starting or stopping (ALGE starting gate STS3 or RLS1/E.
17 = Knurled nut for fastening cover of battery compartment.
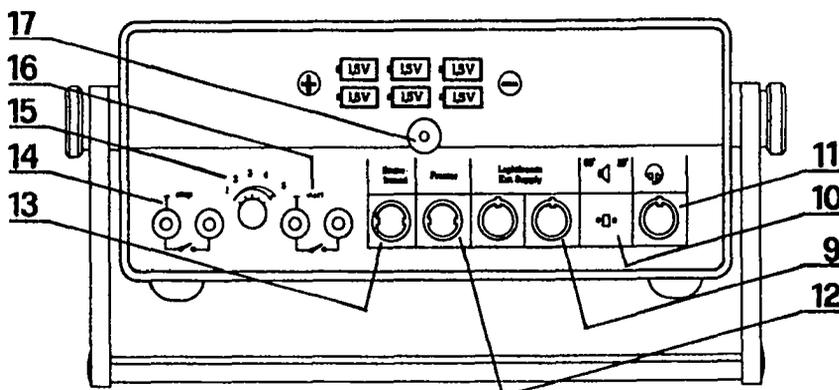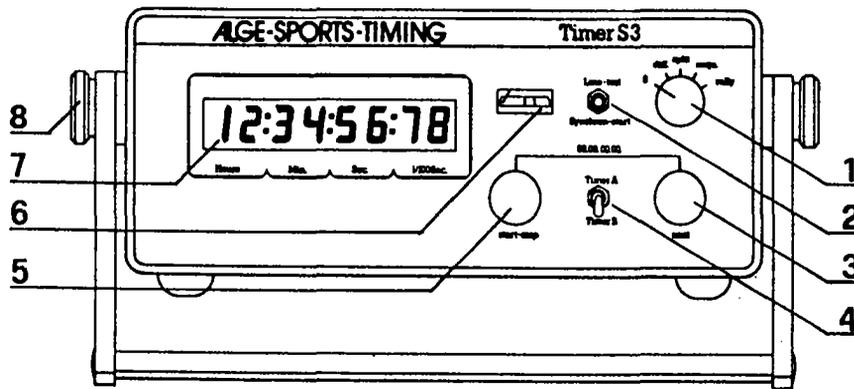
PART I   b) Power supply. Start-up.

The low power consumption made possible by the highly advanced electronics
and the liquid crystal display permit the use of six D size alkaline bat-
teries.
The level meter (6) monitors the state of the batteries. The batteries
do not have to be replaced until the needle no longer stays in the green
field. The six batteries are then inserted in the battery compartment
as illustrated on the battery compartment cover (rear panel of timer).
Important: Use only alkaline batteries.

Caution! When the timer S3 is not in use for an extended period and at
the end of the season in particular, the batteries must be removed from
the timer. Leaky batteries can ruin the high quality electronic components.
A set of new batteries should be used at the beginning of the season.

If the printer P3 is hooked up to the timer S3, alkaline batteries are
insufficient because of the high power consumption of the printer.
For this case we offer rechargeable nickel cadmium batteries of the same
shape and size as the alkaline batteries which can be placed in the bat-
tery compartment of the timer. The NiCad batteries can be completely
charged in 14 hours with available power supply-charger or 12V exterior
battery. The charger or 12V battery is connected to one of the two exter-
nal supply jacks (9) of the timer S3.

A 12V external battery can be used without internal NiCads as well.
A 12V battery with a capacity of approx. 5 Ah is sufficient for all day
operation. Connect red battery clamp to positive pole and black clamp
to negative pole of battery.
Please note: If S3 is supplied with 110V power supply and NiCad batteries,
             internal alkaline batteries may not be used in conjunction
             with charger or external 12V battery.

Start-up: By setting the desired operating mode with the operating mode
selector switch (1), the timer S3 is switched on, the needle of the meter
(6) moves into the green field (provided that the battery voltage or the
supply is correct) and a row of eights appear on the display. The device
is ready for operation only when the display shows 0.00.00 (after about
four or five seconds).
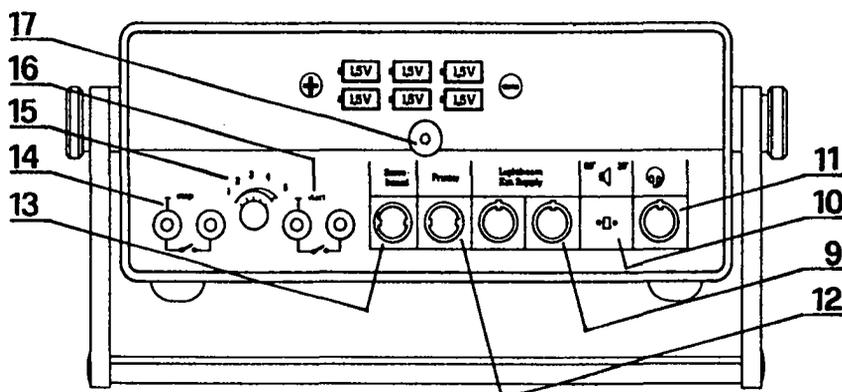
PART I   c)   Operating modes.   - DIFFERENCE

The hours of the time of day are introduced with the red "start-stop" button
(5) and the minuted with the yellow "next" button (3). The synchronous start
is triggered by pressing down the toggle switch (2).
                                                      This starts both
clocks in the timer fully synchronized and starts other timers that may pos-
sibly be connected in absolute synchronisation.

Thereafter the red and yellow buttons function normally again as labeled,
start-stop button (5) and as rejoin button (3) for stored times. Resetting
the time to 0.00.00 by simultaneously pressing both buttons is not possible
in the difference operating mode. This prevents inadvertent resetting.
Should resetting be necessary, the device must be turned off and on again.

In the "difference" operating mode, timer A runs as starting time clock and
timer B as finishing time clock. Start and finish pulses can thus be record-
ed simultaneously. By switching from timer A to B, the starting time (timer
A) or the finishing time (timer B) is indicated on the display (or, with
printer P3, is printed out).

Both clocks have 12 memories each. With cross-country racing, for example,
simultaneous crossings of start and finish can be precessed since up to
12 times on each clock are stored.

The stored times are recalled with the "next" button (3). When all times
have been retrieved from the memory display will show running time again.
The selected timer (A or B) can be stopped manually with the "start-stop"
button. You can thus stop both starting times as well as finishing times,
depending on whether timer A or timer B is on.
See part III a) - difference timing.

- SPLIT OPERATION

With "split" the two timers run seprately, i.e. the timer selected with
the switch (4) is triggered with the first start pulse. The "free" timer
is then started automatically by the second start pulse, even though it
is not switched on. When both timers are running, this is indicated on the
display by the flashing of the colon between minutes and seconds.
Further start pulses now have no effect. A start can be registered by one
of the two timers only when it has been set back to 0.00.00 by simultaneously
pushing the buttons (3+5).
The switched-on timer can be started and stopped manually with the red button
(5).

If more than one stop pulse is received, whether manually (5) or externally
(photocell), these times go into the memory of the switched-on timer, which
is indicated in the display by the first four decimal points from left to
right. Internally, however, the timer continues to run normally. The stored
times are recalled with the "next" button (3), either to be written down or
to be erased. Latter case for unwanted signals only.
In split mode timer can be started and stopped with one photocell only
(circular race with cumulative time). See part III a).

- SEQUENTIAL OPERATION

Lap times can be measured in the sequential mode, with both timers being available, as with "split". At each stop pulse the lap time is indicated and the internal timer is set to zero and immediately restarted.

Additional lap times go into the memory. The start/stop functions are exactly the same as with "split".
Starting and stopping is also possible with one ALGE RLS1 photocell, which is particularly advantageous with this type of operation. All you need to do is couple the start and stop inputs as described in part III a) split and sequential set-up.

- RALLY OPERATION

Differs from "split" operation only in that the clock of the chosen timer is stopped with the "start/stop" button (5) (time-out). This is an adding type of timing for rallies, show jumping (when obstacles are knocked down) e.t.c. An external stop pulse is ineffective during the time-out.

A connected photocell operates in the "split" mode however, so that it is possible to recall the running time with the "next" button (3) after un-wanted triggering.

PART I d) Setting the delay time (Stop input).

This refers to the time during which period no additional pulse will activate
the timer. The delay time is set with the five-level potentiometer (15) on
the back of the timer. The length of this delay can be heard from the acous-
tical peep tone when the photoelectric cell has been tripped.

For alpine skiing, the delay time is generally set the longest because one
racer does not immediately follow the other. This is different in cross-
country skiing, where it is best to determine the ideal delay time through
experimentation. A too long delay time could "swallow up" a second racer
coming right behind, i.e. only one time would be stopped for both racers.
A delay time that is too short can result in one racer stopping the time
twice or more with his hands, trunk and legs.

The following delay times can be set: 2 msec / 30 msec / 120 msec / 400 msec /
1 sec / 2 sec.

The delay time for the starting gate is fixed at approximately one second.

PART I e) Start-finish line test

The toggle switch (2) is pushed upwards to check the electrical connection
between the start triggering device and the timer. If the wiring is ok, the
needle of the level meter (6) stays in the middle of the green field.

Then the start-finish line is shorted at the start, i.e. the two wires are
connected to each other. When "line-test" is now actuated, the needle must
swing completely to the left of the meter. This indicates that the start
line does not have an excessive resistance. Line resistance may be a maxi-
mum of 2000 ohms.

Acoustical signal

The acoustical signal for a start clock is given only in the "difference"
operating mode. The loudspeaker is to be connected to the correspondingly
marked output (10). The start interval can be set to 60" or 30" by turning
the plug 180°. An "alert" tone is given 10 sec. before the start; the count-
down begins 5 sec. later.

Same out-put is used for count-down signal in count-down clock mode.
See part II d).

S3 EXPANDED PROGRAM

PART II a) Speed meter

Depress start/stop button, turn switch (1) while start/stop button is
kept depressed. Display will show all eights for a few seconds.
Thereafter SP 0000 will show up. Select between km/h or m/s with the
toggle switch (4). Timer A = km/h, timer B = m/s.

Select photocell distance with mode selector (1).

Diff = 3 meters / split = 5 meters / seq. = 10 meters / rally =
30 meters.

Connect two photocells as described under set-up example speed meter
and parallel course and make sure the distance between the cells is
exactly measured from center of lens to center of lens for whatever
the setting of the selector.

If you prefer the speed readout in miles per hour set the distance
of the photocells as follows:

DIFF   = 15,84 feet or 15'10 5/64"
SPLIT   = 26,4 feet or 26'4 51/64"
SEQU   = 52,8 feet or 52'9 39/64"
RALLEY = 158,4 feet ·or 158'4 51/64"

Maximum measuring range is 999 km/h. Precision: 1/100 km/h.

Measurements can be made from either direction. While calculation is
made, input of photocells are locked out. Therefore no double impulses
are possible.

Result of the measurement will remain displayed until a new measurement
is made. Should for any reason only one impuls occur, the timer will
automatically reset after 5 seconds.

All data is available at printer output and display board output.

PART II b) Time of day printer. (S3 and P3.)

To choose the time of day printer programs proceed as follows:

1. Depress yellow button NEXT and hold down.

2. While holding down yellow button turn timer to either DIFF or SPLIT.
   (DIFF or SPLIT are the same mode except in DIFF mode the timer can
   not be reset.

   Release NEXT button as soon as all eights show up.

   After all eights have disappeared HP 0.00.00 will come on.
   Time of day can be introduced by pressing START/STOP button for hours
   and NEXT button for minutes.
   Clock can be started from zero or with time of day introduced with
   first impulse from start input or by depressing SYNCHRO-START
   switch (2).
   After the clock has started,running time will be shown in display.
   A single impulse will freeze the time on the display for about five
   seconds, print out the time, thereafter running time will show again.
   If multiple impulses arrive, times will go into memory and will be
   printed out automatically one after the other. The times being printed
   are shown also in the display.

   Impulses from either start or stop inputs are identified by SZ for start
   time and ZZ for finish time. Therefore simultaneous incoming pulses from
   start or finish can be easily identified on paper.

   Depressing START/STOP BUTTON during timing will print a time identified
   with ZW for intermediate time.

   Measuring range is from 1/1000 sec. to 23h 59:59.999.

   Connection of external triggering devices (photocell e.t.c.) can be
   made to DIN recepticals (pin 3 + 1 for start - pin 3 + 2 for finish)
   or to red and green banana recepticals.

   PLEASE NOTE: Timing an event where closely following impulses are expec-
   ted (automobile or foot races) only stop input should be used, due to its
   adjustable delay time.

SEQUENTIAL NUMBER PROGRAMMING.

Sequential numbers can be programmed for start or stop times (1 - 9999).
I.e. sequential # are the numbers shown in front of the time indicating
the amount of prints.
Each of the sequential # can be reset to zero during timing without affect-
ing the time.
Hold down yellow button and simultaneously turn timer on. While all eights
are still on depress and hold until HP 0.00.00 appear in display:

                    Yellow button = sequential # finish times,
                    red button   = sequential # start times,
                    both buttons   = sequential # both times.

To reset sequential #:

Start times   - depress NEXT button with toggle switch in timer A position.
Finish times - depress NEXT button with toggle switch in timer B position.

Toggle switch timer A / timer B (4) further selects the paper feed on the
printer: A = single line advance, B = double line advance.

SEQU. and RALLY same as on normal timer S3.

PART II c) Parallel program.

1/1000 sec. precision with course identification.

To select parallel program depress and hold both buttons "start/stop"
and "next" while switching timer on. Mode selector switch (1) serves
only as on-off switch in this program.
After all eights have disappeared P0000 will show up.
Two cells RLS1 or RLS1/E are connected according to set-up example.

If cell connected to start is triggered first the # 1 will appear all
the way to the left in the display. If on the other hand the stop cell
is triggered first the # 2 will appear.

On the printer and display board,course identification will be signified
with r + b (red and blue).
The measurement can be left on the display and next timing result will
automatically appear without resetting the timer.
If one competitor does not finish, the timer can be reset manually or
it will automatically reset after 30 seconds.

Programming of display output for parallel slalom.

As described above for parallel program, depress and hold both buttons
while switching timer on. Release "next" but continue to hold start/stop
button until P0000 comes up. Output is now programmed for the 5 digit
display,showing 1/100 sec. precision.
If normal procedure of parallel program is followed, output is programmed
for the 6 digit display board with 1/1000 sec. precision.

PART II d) Countdown timer. 1/100 sec. precision.

Turn timer on while all eights are displayed, depress and hold the "next"
button until LA 0.00.00 appears.
Insert minutes up to 100 with"start/stop"button. Insert seconds with"next"
button up to 60.

Start countdown with 'synchron-start lever.Once timer is started, impulses
from exterior source connected to DIN receptical with stop cable or red
banana jacks will freeze display while clock internally keeps counting
down (split mode). Countdown can be interupted and resumed with start/stop
button.

When clock reaches zero, a short audio signal is provided on the loudspeaker
output.

If no other time is introduced, the previously selected countdown time
will automatically come up after the zeros disappear.

If no countdown time is introduced and clock is started, countdown will
commence at 99:59.99.

Again, all data is available at printer and display output.
Toggle switch TA/TB selects single or double line paper feed on printer.

PART II e

ALL SECONDS MODE.

In certain timing applications it is advantageous to time in all seconds
instead of the usual sec., min., hour mode.

To get the all seconds mode, turn selector switch (1) directly to rally
position and while all eights are displayed depress start/stop button
and hold until the eights disappear. Now turn selector switch to desired
mode.

Please note: All seconds mode only works in split, sequential and rally
modes. Seconds mode is recognizable by the absence of the colons when
unit is first programmed. Colons will appear again in split and sequential
modes when both clocks are running.

Measuring range is 9999 seconds.

Part II f) Split-Sequential Mode.

Application: Simultaneous measurement of lap times (sequ.) and total time (split) for one competitor.

TIMER A
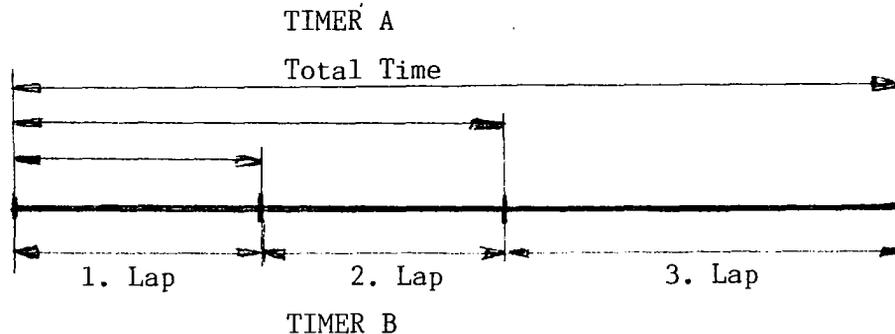
Mode selection.

- Turn selector switch (1) to DIFF position and wait until 0:00.00 shows up
- Press synchron start switch (2) down
- Press red and yellow buttons (3+5) simultaneously
- Turn selector switch (1) to sequential position
- Press red and yellow buttons (3+5) simultaneously
- Display must show 0:00.00

The unit is now ready for timing.

Functions.

All functions and connections are identical to split mode except that with toggle switch (4) the selection between lap and split readout is possible. The timer will keep track of individual lap times with toggle switch (4) in TIMER B position and split time (total time) with switch in TIMER A position.

Example.

A car makes several laps in a circular course and the individual lap times are required as well as the total time of all laps combined.
Toggle switch (4) is placed to TIMER B position. Every interruption of the photocell will display the net lap time. By switching over to TIMER A position, the combined time of all laps will be displayed.
All data is available on printer and display output.

PLEASE NOTE:
Even though both clocks run independently and only one of the two modes is displayed, an impulse from the photocell will evoke a triggering of both timers. If the switch (4) is in TIMER B and a triggering occurs, the display freezes. To catch up to running time, the yellow button is depressed. Now if the switch is placed to TIMER A you will note that the display is also frozen. The yellow button should be pressed to catch up to running time if the car is to make more laps. The reason for this is, that if the timer is in lap mode (TIMER B) and never switched over to split mode (TIMER A) and cought up, times stack up in memory (up to 12) and if the memory is full the times are lost. So it could happen that if a car makes more than 12 laps and the race is over, your final total time would be lost.
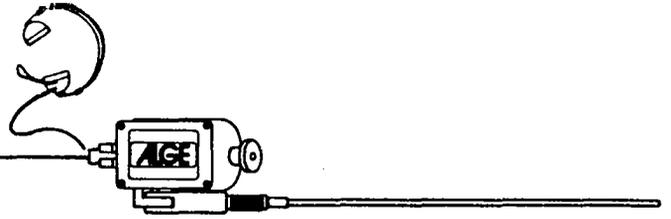
PART III   a)   Set-up example. Absolute timing with one racer on course.

Installation and connections according to illustration. Start gate is
connected to green banana recepticals (16). Polarity is not important.
RLS1 is connected with stop cable (max. 150 ft.) to DIN recepticals (9)
or RLS1/E is connected to red banana receptical (14).
Turn operating mode switch to "split", wait for 0.00.00 to appear on the
display, align photocell barrier (see section on photocell barrier)
and the first racer can start. If no printer P3 is connected, note the
time when he crosses the finish line. With printer connected, wait for
print-out, then reset timer by simultaneously pressing red and yellow
buttons (3+5). Ready for next racer.

Two racers on course.

Settings and connections as before. Set timer A for the first racer
with the selector switch (4). When he starts, only timer A is triggered.
The start of the second racer automatically causes timer B to trigger
without the necessity of switching it on separately. Both timers running
is indicated by the flashing of the colon between the minutes and seconds.
It is important, however, that timer A is selected when starter #1 passes
the finish line. The time is noted and timer A is reset to zero.
Racer #3 can start. It is now important to select timer B so that racer
#2 stops his clock when crossing finish line. Note time and reset timer
B. Timer is ready for #4.

Difference timing with more than two racers on the course simultaneously.

This operating mode is used when more than two racers are on the course
at the same time.
Installation and connections as before. Turn operating mode selector
switch to "difference", wait for 0.00.00 on the display, introduce time
of day, the hours with red button (5) and the minutes with the yellow
button (3). Start both timers by depressing toggle switch (2). Both
clocks are now running fully synchronized. All start pulses go to timer
A and all finish pulses to timer B, no matter which timer is selected.
When a racer has been started, his starting time is read on timer A,
noted and the running time is joined by pressing "next" button (3).
When a racer crosses the finish line, the time is stopped on timer B.
The net time of a competitor is calculated from the difference between
finish time and starting time. Since each timer is equipped with 12
memories, arrivals at the finish in quick succession and simultaneous
occuring starts go into memory and can be called back with the "next"
button. See section on the "difference" operating mode.
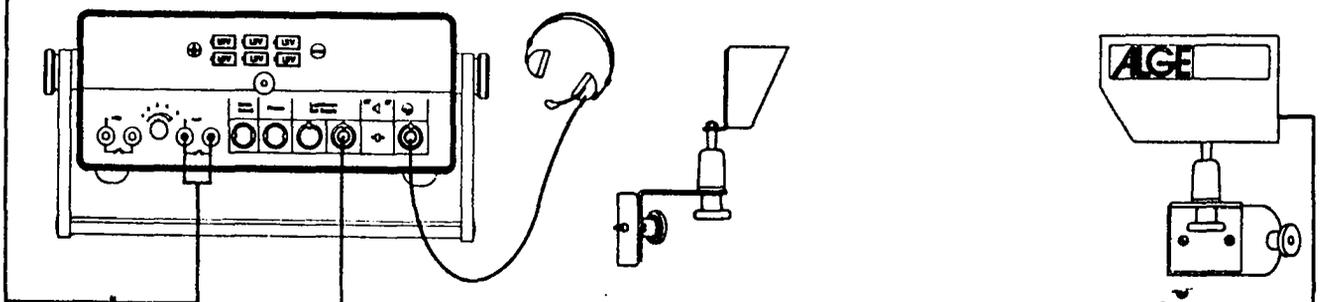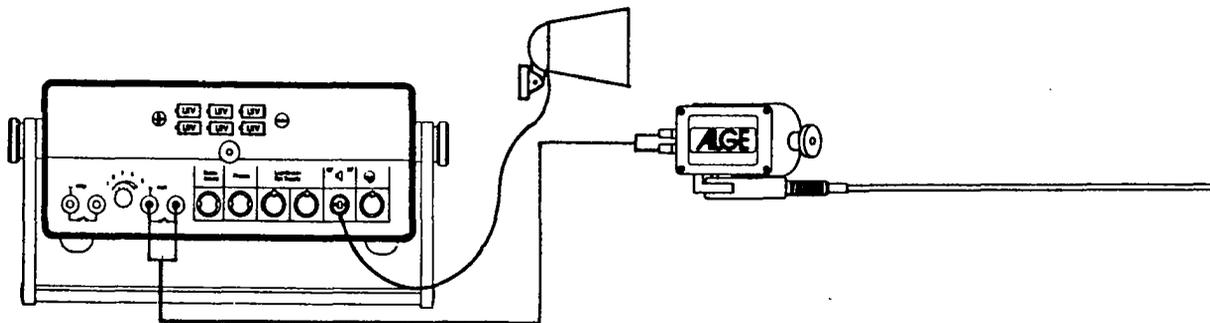
PART III   a)   Set-up example. Difference timing without cable connection
                between start and finish

Two S3 timers are needed for this kind of operation. The two devices are
connected together with the short black connection cable via the inputs
(9). The operating mode selector switch (1) is turned to "difference" on
both timers. The same time of day is keyed in on both devices and both
clocks are started synchronously be actuating the toggle switch (4) on
one timer only. Then the connection cable is to be removed.

Connect starting gate to timer and place toggle switch (4) to timer A
to receive start impulses. The loudspeaker for the start signals can be
plugged into this timer (jack 10) if desired. By turning the connecting
plug 180°, a choice can be made between 30 and 60 sec. start intervals.

The second timer at the finish with clock B selected is used for finish
times. The photocell is connected to this timer.

Starting times and finishing times are assigned to the appropriate
competitors numbers and both times subtracted for net time.
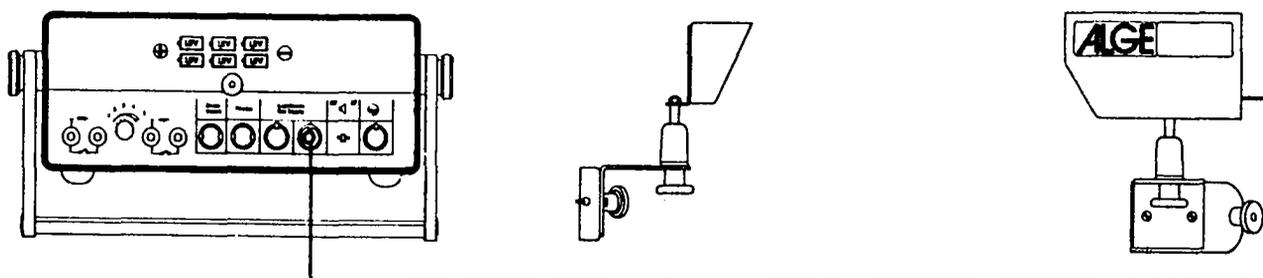
PARTS III a) <u>Set-up example. Parallel course timing or speed meter</u>

Select parallel program or speed program. Connect one RLS1 with start cable
to DIN receptical. Connect the second photocell to other DIN receptical
with stop cable.

RLS1/E may be used with connections made to red or green banana recepticals.
See speed meter and parallel program for complete instructions.
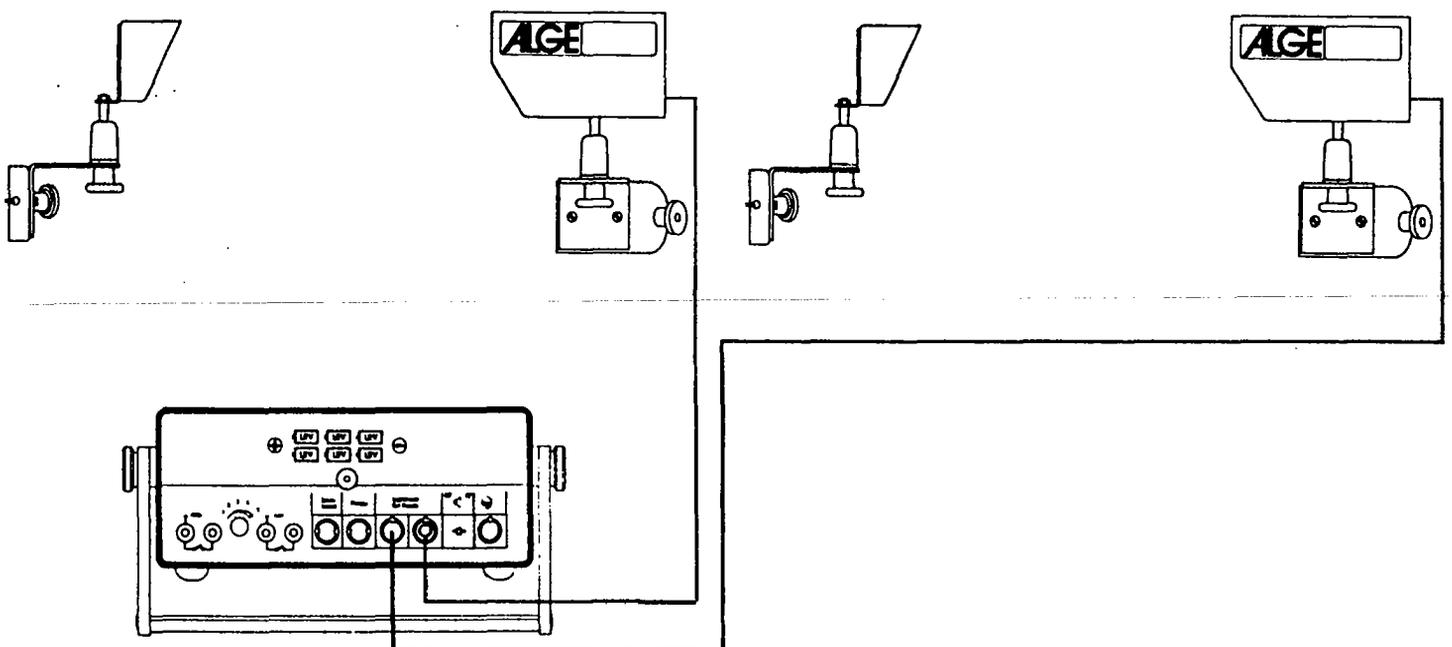
PART III a) Set-up example. Circular course timing.

Split mode. Two competitors net time one lap each.

The same basic procedure applies as on absolute timing for one or two
competitors on course in ski timing set-up. However, the triggering for
start and stop occurs with the same device (photocell, tape switch e.t.c.).

Connect RLS1 with start cable to DIN receptical (9) or RLSI/E to start
banana jack (16). Make single wire jumper from right green jack to right
red jack (backview).

Please note: With two competitors in course, if one competitor should
finish before the next competitor goes into course, the empty clock as-
signed to the next competitor must be reset first.
Example: Since both clocks will be started and stopped (split) with one
photocell, the second impuls (finish of first competitor) will stop
(split) clock A but at the same time start clock B.
Therefore if first competitor has finished on clock A and second compe-
titor want to start immediately thereafter on clock B, clock B must be
reset first.
If at all times two competitors are on the course, there is no need to
worry about resetting an unoccupied clock.

Sequential mode. One or two competitors net time unlimited amount of laps.

For one competitor in course the procedure is the same as in split mode
circular race.
Competitor starts clock A (toggle switch 4 is not touched) at the end of
first lap, cell is tripped, display shows net lap time, internally clock A
is reset to zero and commences timing the second lap.
After the time has been written down, running time is joined with NEXT
button. The time that appears in the display is the elapsed time the
competitor is in the second lap.

For two competitors in course the same procedure as above is used. This
time, however, the toggle switch (4) comes into play.

- Place switch to timer A, first competitor starts clock A.

- Place switch to timer B, second competitor starts clock B.

Two competitors are now in the course. Each one can be timed any amount
of laps net time.

It is now important to remember which competitor is on which clock for
finishing sequence. An accidental triggering would reset the clock that is
selected at the time. Reset also occurs with start/stop button.
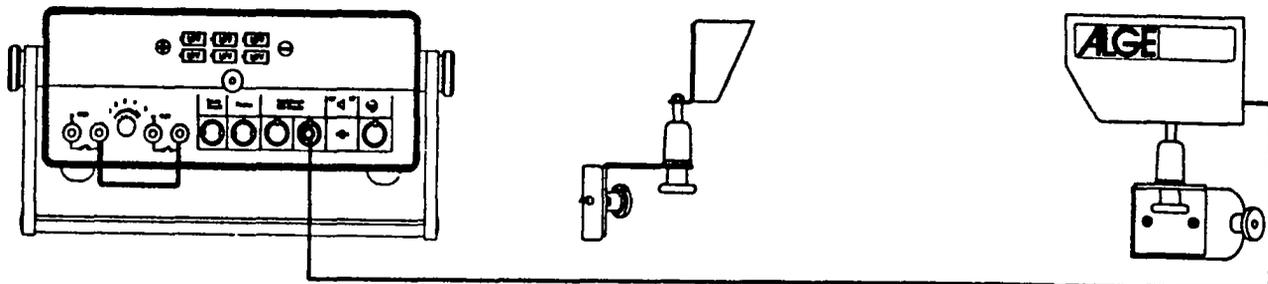
PART III b) <u>DIN plug cable pin assignment</u>

- Power supply external timer and photocell (6V, 12V or charger).

    Pin 3 ground

    Pin 4 positive (U ext.)

- Start cable (3 leads) with power supply from timer to cell.

    Pin 3 ground

    Pin 1 start

    Pin 5 + 5V to cell
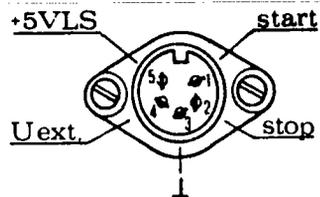

- Stop cable (3 leads) with power supply from timer to cell.
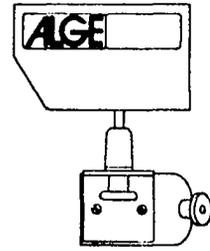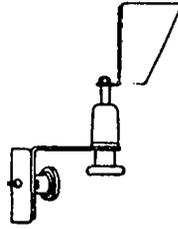
    Pin 3 ground

    Pin 2 stop

    Pin 5 + 5V to cell

    Pin 6 not used.

TYPE RLS 1

PART III b) Infrared photocell RLS1 and RLS1/E

This photocell is a triggering device which is powered directly from the
timer via a 3 lead wire (DIN plug only) up to a maximum of 150 feet.
For longer distances see RLS1/E.
This cell is unaffected by extraneous light. It consists on one side of an
emitter (upper lens) and a receiver (lower lens) and a reflector on the other
side. Infrared pulsed light is emitted, reflected and received back.

The emitter/receiver and the reflector are fastened opposite each other at
corresponding heights to a bar or similar object and are aligned with each
other. The distance between the reflector and the emitter/receiver may not
be less than three meters nor greater than twenty meters.

The emitter/receiver is connected with appropriate cable to the correspond-
ingly marked jack of the switched on timing device. If the needle of the
level meter on the timer swings rhythmically, the photocell is not properly
aligned. In this case the cell is to be aligned so that the needle of the
level meter on the back of the photocell comes to rest as far into the green
field as possible.

Note carefully: When testing the photocell, be sure the reflector is at
least 3 meters (9 feet) from photocell. If desired the cell can be supplied
with a range of a minimum of 1 meter and a maximum of 4 meters (for bob-
sled and luge).

RLS1/E
This photocell functions and can be used exactly the same as RLS1 with the
addition that it can be powered externally with a DC supply 6V to 15V.
(6V handlantern battery sufficient).
When powered externally, only a 2 lead wire is needed for triggering.
Connections are made to timer on either start or stop banana recepticals
and the two binding posts on the photocell. AWG #20 or 22 is recommended
for distances one mile or less.

Power consumption on both cells approximately 25 mA.

Connect enclosed power cord to 5 pin DIN receptical on photocell.
OBSERVE POLARITY.

Polarity for triggering (2 green binding posts) is unimportant.
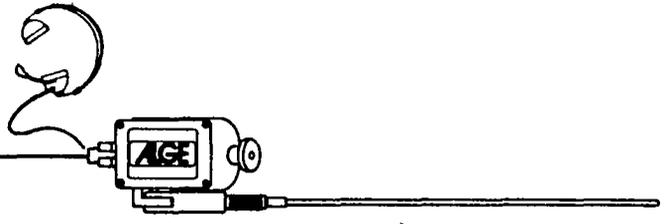
PART III c) STS3 start gate description

The starting gate is fastened to a picket or similar object at the start
at about knee height. When screwing on the starting rod, care must be
taken to tighten it completely so that it does not come loose by itself.

The starting gate has two connections: Two green banana plug jacks for
the twin wire start-finish line and a DIN receptical for the audio set.

The starting gate employs a switch with normally open contact which
closes when the starting rod is opened to an angle of about 20°.
The starting gate also includes an audio amplifier and a 9V transistor
battery for feeding the audio amplifier. This battery normally lasts
for an entire season. However, a condition to this is that the head set
be unplugged after the competition, thus switching off the battery.
When the season is over this battery is to be removed and at the beginning
of the next season a new battery is to be installed.

STS3/II Same as STS3 but with two switches for back-up timing.

The two green posts for one circuitry.

The two black posts for other circuitry.
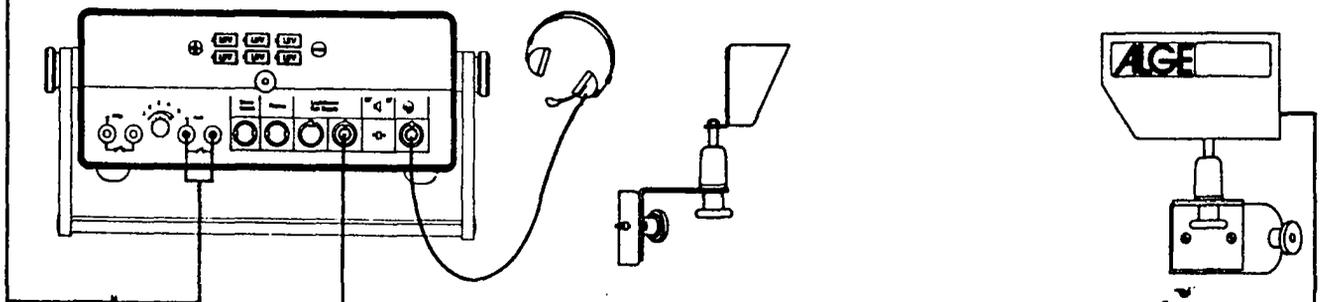
PART III   d)   <u>P3 Printer.</u>

This printer receives its data and power from the S3 timer.
To put into service, it is as simple as plugging the attached cable
into the output receptical marked PRINTER on the back of the S3.
The P3 incorporates a dot matrix electrosensitive printing mechanism
which requires the use of metallized paper.
It further incorporates its own microprocessor and other electronics
and should therefore be treated as any other delicate instrument.
It should not come in direct contact with water or be exposed to too
high humidity.

A few words of caution:

DO NOT let solid objects (paper clips e.t.c.) fall into the printing
mechanism. If printer should jam for any reason, immediately unplug
from S3 and inspect for the cause of the trouble.

DO NOT advance paper while printer is printing and always advance
with the advance wheel NOT by pulling on paper.

To check and change paper:

Push the two cover release buttons down so they jump up. The cover
can now be lifted up. A black stripe will become visible on the edge
of paper when a roll is about to run out.

- Lift out used roll and tear off paper before it goes into printer.
  Pull out remaining paper with paper advance wheel.

- Insert a new roll so shiny side points down. Turn paper advance
  wheel towards the rear until paper comes out over the tear off
  blade.

- Replace cover and push the two buttons down until they stay in
  lower position.

  Printer is supplied with five rolls of paper. Make sure you always
  have enough on hand.

  Power consumption approximately 800 MA.

SPECIAL NOTE:

With a new (full) roll of paper in the holder it can happen that if
the printer received rough handling during transport, that the roll
can unwind and expand and touch the printer cover. This restricts
the paper advance and the printer may not print. If this happens
remove the cover and make sure that the roll is tightly rolled up.

PART III e) Technical data.

Timing range:	23 hrs, 59 min, 59.99 sec.
Accuracy:	± 0.005 sec/hr at 20°C and ± 0.05 sec/hr at −15°C.
Quartz frequency:	6240 Hz.
Operative temp. range:	−25°C to +65°c.
Memory:	2 x 12 times.
Inputs:	2 inputs 6 pin DIN recepticals. See part III b) for pin assignment. Red and green banana recepticals for start gate and/or RLS1/E.
Outputs:	Output for ALGE GAZ display board, V24, 5 pin DIN receptical 45327 with following pin assignment. 1 = ground / 2+4 = +9−16V output / 3 = finish time / 5 = running time. Connection for printer, V24, 5 pin DIN 45327. Connection for audio set, 5 pin DIN 41524 with following pin assignment. 1 = microphone, 2 = ground, 3 = headphones (loudspeaker impedance less than 250 ohms). Connection for countdown loudspeaker, DIN 41529.
Power supply:	Internal with 6 D size alkaline or 6 D size NICAD batteries. External with 12V battery or 9−16V ALGE charger.
Power consumption:	Approx. 0.1 A at 7.5 − 16V.
Battery life:	Alkaline without printer 80 − 100 hrs. 4 Ah. NICADS with printer 10 hrs.

Computer connection (Connection for display board and Printer P3):

Serial interface: 2 serial data outputs (Chanal 1 and 2) without handshake.

Transmission speed: 2400 baud

Voltage: +/- 5 Volt

Output format: 1 start bit, 7 ASCII bit, no parity bit, 2 stop bit

Output: No. hundert
              No. tens
              No. ones

              5 blancs
   hours tens
              hours ones
              colon (3A)
              minutes tens
              minutes ones
              colon (3A)
              seconds tens
              seconds ones
              point (2E)

              1/10 seconds   only for stopped time (otherwise blanc)
              1/100 seconds only for stopped time (otherwise blanc)

              1/1000 seconds only for AUTOMATIC program and stopped time

              blanc or carriage return (0D)
              blanc or carriage return (0D)

Carriage return (0D) is the end of each transmission.

Normbuchsen
DIN 45322

GA   PR

Display-board   Printer
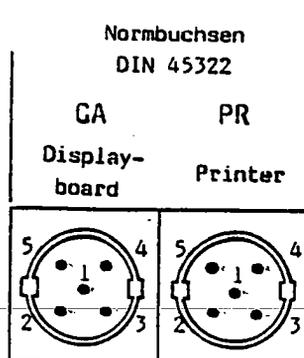
GA + PR:	Pin 1		GND
GA + PR:	Pin 2 + 4		+7 to 15 V (voltage of power supply)
GA:	Pin 3		serial data, final times
GA:	Pin 5		serial data, running times
PR:	Pin 3 + 5		serial data, final times

8 CHANNEL OPERATING MODE

The 8 channel module built in to the S3 allows the timing and
identification of 8 lanes or points.
A typical application is swimming. An accustical trigger device
(pistol with sensor) or any normally open contact switch is
connected to the start input (16).
8 individual trigger devices (touch pads, hand switches or other
normally open sensors) are connected to the 8 inputs marked K1-K8.
The clock starts, competitors from one to eight start and as they
arrive the order of finish is identified with the lane number and
the time printed next to the number. Other uses are speed skating,
persuit cycling, acceleration tests e.t.c.

The 8 channel mode becomes operative only in the time of day mode.

Within the 8 channel time of day mode are two sub-modes we will call
A and B. These A and B sub-modes refer to the position of the toggle
switch (4) as the timer is first programmed.

TIME OF DAY SUB-MODE A is only usable with the printer P3 connected.
Place toggle switch (4) to timer A position and refer to the chapter
"time of day mode" in this booklet. The programming and features are
identical except for the addition of the 8 channels. The object of
this mode is to have the hands free. Single or multiple impulses
from any of the inputs of the timer are immediately printed out and
identified. No input identification is made on the timer's display.

SUB-MODE B offers the exact same features as sub-mode A except that
the individual times from the various inputs stay in the timer's
memory and must be called off one by one with the yellow button.
This mode would be used with no printer available or with a display
board connected where individual times need to be displayed longer
than the automatic mode.
In this mode the individul inputs are identified all the way on the
left side of the display.

INPUT IDENTIFICATION

Input	Selector mode	Split	Sequential	Ralley
Manual	Red start/stop button	9	9	H
Start	Green banana jacks (16)	0	0	0
Stop	Red banana jacks (14)	L	P	L
8channel	8 banana jacks K1-K8	1-8		

Please note: No matter where the selector switch is placed the
8 channel inputs always work in split mode. The finish input is only
affected by the mode selector. Refer to individual operating modes
in this booklet.
There are a total of 18 memory locations available either from
single or combined inputs.
To reset the timer to zero without erasing the time of day mode,
press the red and yellow buttons together once only. If the display
should read something other than 0-0000 start timer by pressing
synchron start lever and then reset once more.