# Application Note #4

# Axle Weighing on the M2000

**Axle weighing applications can be easily created on the M2000. This application note discusses different axle weighing application scenarios including wheel weighers.**

## This application note discusses the following:

- **Accumulating axles**
- **Working with axle pads (2 channel scale)**
- **Truck In/ Truck Out axle weighing**
- **Displaying and printing axle weights**

**This application note has 2 examples and requires M2000 version 1.35 or greater. Ticket formatting in the examples are based on an Epson Tape printer.**

# Example 1  (basic axle weighing)

**This example demonstrates:**

- **Printing axle weights**
- **Implementing an axle counter**
- **Initializing accumulator and axle counter to zero**
- **Printing totals and axle weights**

# Basic Axle Weighing

This ticket was designed for safety inspectors that check axle weights on trucks using an axle scale. Once again we use an Epson tape printer. This ticket program is split over three different tickets that perform different functions.

The inspector starts the weighing process by using the IN key. This prints the ticket header and clears the accumulator registers. When the trucks axle is positioned over the scale the PRINT/SELECT key is pressed to capture and print the axle weight. This is repeated for each axle on the scale. When the truck is finished being weighed then the OUT key is used to complete the ticket and print the total axle weights.

The tickets are defined and their keys are assigned:

**IN** key is assigned to ticket 200 and is used to start the axle weighing process
**PRINT/SELECT** key is assigned to ticket 201 and is used to weigh an axle
**OUT** key is assigned to ticket 202 and is used to end the axle weighing sequence

### Ticket 200 start of axle weighing

This ticket prints the site location time/date and clears the accumulators used to total axle weights and axle counts.

**13** CR
**10** LF
**P100** emphasized mode on
**P101** double height ON
**P104** underline ON
**80,114,105,110,103,101, 32** "Prince "
**71,101,111,114,103,101 ,32, 83,111,117,116,104, 32** "George South"
**87, 101,105,103,104, 32, 83,99,97,108,101**, "Weight Scale"
**P108** reset printer fonts
**13** CR
**10** LF
**C20** print time
**32** space
**C21** print date
**C22** Clear the ACC1 register (total axle weights)
**C257** Clear the ACC4 register (axle count)
**C259** increment axle counter to 1
**13** CR
**10** LF

### Ticket 201 print an axle number and axle weight

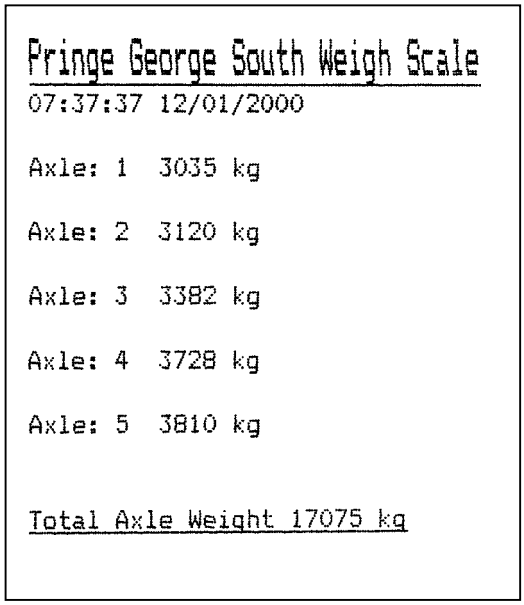
This Ticket Prints the Axel # and Axle Weight and adds the weight to the accumulator.

**13** CR
**10** LF
**P913** send the string "axle: " to the printer
**C256** print the acc4 as integer number (axle count)
**32,32** " " add some spaces
**C30** print gross weight channel 1
**C25** add gross weight to ACC1
**C259** increment the axle count in ACC4
**13** CR
**10** LF

### Ticket 202 finish axle weighing, print total axle weights

Print the total axels and finish off the ticket

**10** LF
**10** LF
**P104** underline ON
**P100** emphasized mode on
**P914** send the string "Total Axle Weight " to the printer
**C24** print the total axle weight
**P108** reset printer fonts
**13** CR
**P114** form feed 9 lines
**9** number of lines



# Example 2  (Wheel weighing)

**This example demonstrates:**

- **2 weigh pads connected to an M2000**
- **Printing left and right axle weights**
- **Entering an ID number for a truck**
- **Accumulating axle weights**
- **Implementing an axle counter**
- **Initializing accumulator and axle counter to zero**

# Axle Pad weighing (using 2 wheel weighers)

A logging company uses axle pads to check proper loading of logging trucks. Two wheel pads or scales are used for the left and right axle wheels. Channels 1 and 2 on the M2000 are connected to individual axle pads running in TOTAL mode. The indicator is connected to a tape printer. The indicator prints the left and right axle weights separately and the totals. From this ticket the truck can be verified that it is loaded properly.

This application uses 3 tickets and is meant for a tape printer. Some minor changed are required to adapt the ticket to other printers.

**Ticket 200**
This ticket is assigned to the IN key. This ticket is used to start the weighing process. When this ticket is called the axle totals are cleared and indicator prompts the user for a truck ID. After the user enters the truck ID the indicator prints the truck ID and time and date to the printer.

**Ticket 201**
This ticket is assigned to the print select key. Whenever it is pressed it prints the axle number, left axle weight, right axle weight and total axle weight. The tickets increments the internal axle count and adds the axle weight to the totalizer.

**Ticket 202**
Assigned to the OUT key.
This ticket prints the total truck weight and the left and right axle totals.

**Ticket 200**
This ticket is assigned to the IN key
Prints the ticket header and time and date.

**C26** clear the axle counter register to zero
**C27** increment axle count to 1
**C22** clear ACC1 to zero (left axle accumulator)
**C220** clear ACC2 to zero (right axle accumulator)

**C81** prompt for ID number (ID number stored in ID register)
(note if clear is pressed, then the ticket aborts here)

**13** CR
**10** LF

**65,120,108,101, 32 ,67,104,101,99,107** "Axle Check "

**13** CR
**10** LF

**C20** print time
**32** space
**C21** print date

**13** CR
**10** LF

**P906** send the string "TRUCK ID" to the printer

**C79** print the ID number stored in the ID register

**13** CR
**10** LF
**10** LF

**P913** send the string "Axle" to the printer
**32,32** spaces
**P922** send the string "Left" to the printer
**32,32,32** spaces
**P923** send the string "Right" to the printer
**32,32,32** spaces
**P904** send the string "Total" to the printer

**13** CR
**10** LF

Axle Check
02:17:29 11/09/2000
Truck ID: 123

Axle Left Right Total

**Ticket 201**
This ticket is assigned to the PRINT SELECT key
Prints the axle weights.

**13** CR
**10** LF

**C288** ACC1 = ACC1 + channel 1 gross weight (left axle)
**C289** ACC2 = ACC2 + channel 2 gross weight (right axle)

**C28** print the axle count value
**32,32,32** spaces

**C30** print the ACC1 register (print left axle weight)
**32,32** spaces

**C31** print the ACC2 register (print right axle weight)
**32,32** spaces

**C46** print the total of active channels (total axle weight)

**C27** increment the axle count

**13** CR
**10** LF

```
001   938 kg  1742 kg  2680 kg

002   954 kg  1742 kg  2696 kg

003   978 kg  1746 kg  2724 kg

004   932 kg  1748 kg  2680 kg
```

**Ticket 202**
Assigned to the out key.
This ticket prints the trucks total axle weight.

**13** CR
**10** LF

**P914** send the string "**Total Axle Weight**" to the printer
**P922** send the string "**Left** " to the printer
**C24** print ACC1 weight value
**13** CR
**10** LF

**P914** send the string "**Total Axle Weight**" to the printer
**P923** send the string "**Right** " to the printer
**C240** print ACC2 weight value
**13** CR
**10** LF

**C251** ACC4=ACC1+ACC2
**P924** send the string "**Total Truck Weight**" to the printer
**C255** print ACC4 (total axle weight)

**13** CR
**10** LF
**10** LF
**10** LF

An example of what the ticket will look like is shown below:

Axle Check
02:17:29 11/09/2000
Truck ID: 123

| Axle | Left | Right | Total |
|---|---|---|---|
| 001 | 938 kg | 1742 kg | 2680 kg |
| 002 | 954 kg | 1742 kg | 2696 kg |
| 003 | 978 kg | 1746 kg | 2724 kg |
| 004 | 932 kg | 1748 kg | 2680 kg |

Total Axle Weight Left 3802 kg
Total Axle Weight Right 6978 kg
Total Truck Weight 10780 kg

# Example 3 (Wheel weighing (no printer))

**This example demonstrates:**

- **An application that does not use a printer**
- **2 weigh pads connected to an M2000**
- **Sending text messages to the display**
- **Displaying axle count on the display**
- **Accumulating axle weights**
- **Displaying truck total on display**

# Axle Pad weighing (with no printer)

This example is similar to the previous example where two wheel weigh pads are used to weigh axles. The difference here is that we do not use a printer to record the results, as the operating environment does not allow us to do so.

We run the indicator in scan mode. The indicator will then scan through the left wheel, right wheel and the total axle weight. So the operator will have a continuous visual of the weigh pads.

We will use similar tickets to totalize the axle weight, but we won't print them, but instead display the total axle weights on the indicators display. This ticket is designed for two axle pads, but can be adapted to a single axle scale if required.

Three tickets are used for this application:

**Ticket 200**
This ticket is assigned to the IN key.
It simply clears the running total to zero. It also displays the message "cleared" on the display to indicate to the operator that the axle totals have been cleared.

**Ticket 201**
This ticket is assigned to the print select key. Whenever it is pressed the sum of channel 1 and 2 are added to the axle running total. The axle count is briefly displayed on the display to indicate which axle count you are on.

**Ticket 202**
Assigned to the OUT key.
This ticket displays the total axle weight of the truck. It sends a message to the display "TOTAL" and the display the total weight for 3 seconds.

**Ticket 200**
This ticket is assigned to the IN key.
Clear accumulators to zero.

**C300** "send 6 characters to the display_
**67,76,69,65,82,69,68** "CLEARED"
**C405** pause 1 sec
**C301** reset display back to weight

**C26** clear the axle counter register to zero
**C27** increment axle count to 1
**C257** clear ACC4 to zero
**C280** ACC5=ACC4 (clear the axle totals stored in ACC5)

**Ticket 201**
This ticket is assigned to the print select key.
Add axle weight to axle total.

**C297** ACC1 = channel 1 gross weight (left axle)
**C298** ACC2 = channel 2 gross weight (right axle)
**C253** ACC4 = ACC1+ACC2 (total of axle weight = left+right)
**C296** ACC5=ACC5+ACC4 add axle weight to accumulator (total axle weight)

**C264** copy axle count to ACC4
**C411** display ACC4 to display as integer
**C405** pause 1 sec
**C301** reset display back to weight

**C27** increment the axle count

**Ticket 202**
This ticket is assigned to the OUT key.
Display total axle weights.

**C300** "send 6 characters to the display_
**84,79,64,65,76,32** "TOTAL "
**C405** pause 1 sec

**C281** ACC4=ACC5 copy total axle weight to ACC4
**C410** display ACC4 to the display as weight (total axle weight)
**C405** pause 1 sec
**C405** pause 1 sec
**C405** pause 1 sec
**C301** reset display back to weight

# Example 4  (truck in/ truck out)

**This example demonstrates:**

- **Combining axle weighing with truck in/out**
- **Printing axle weights**
- **Implementing an axle counter**
- **Initializing accumulator and axle counter to zero**
- **Printing totals and axle weights**
- **Storing and recalling truck tare weights**
- **Print Gross, Tare, Net**

# Axle Scale with Truck in/ Truck out

A customer has an axle scale and wants to weight the individual axles on the truck and store the total weight using an ID number. This procedure is done both when the truck enters and leaves the facility. At the end of the transaction the driver will have a ticket showing the gross, tare and net weights.

This application requires some careful thought on the optimal procedure for weighing the axles.

To start axle-weighing press 200 followed by the print/select key. This prints the time and date and clears the axle weight accumulator. From here on the operator simply pressed the print/select key to record an axle weight. An axle weight is printed along with the axle number.

When the user has finished weighing all the axles on the truck he can then press the IN key for an inbound transaction or the OUT key for an outbound transaction. The user is then prompted for a truck ID number to either store or recall the total truck axle weights. The OUT key will also print the gross tare and net weights.

**IN** key is assigned to ticket 202 and is used to start the axle weighing process
**PRINT/SELECT** key is assigned to ticket 201 and is used to weigh an axle
**OUT** key is assigned to ticket 203 and is used to end the axle weighing sequence

We are using an EPSON tape printer for this ticket.

### Ticket source definition

Four tickets will be used for this application and they are discussed below:

**Ticket 200**
This ticket will be used for the axle weighing procedure. It prints the time and date and the company name. Clears the accumulators to zero and prepares the axle weighing procedure. This ticket starts the axle weighing process. You must enter 200 print/select to start axle weighing.

**Ticket 201**
This ticket is assigned to the print/select key. Every time you press the Print/Select key an axle weight will be recorded and printed.

**Ticket 202**
This ticket is assigned to the IN key and is used to record the truck IN weight. Pressing the IN key will total all the axle weights and store them under an ID number. So after you are done with axle weighing (started by ticket 200), you would then finish the axle weighing for the inbound truck by pressing the IN key followed by print select.

**Ticket 203**
This ticket is assigned to the OUT key and completes the weighing transaction. It totalizes the outbound axles weights and then prompts the user to enter an ID number to retrieve the stored TARE weight. It finishes the ticket off by printing the gross tare and net weights.

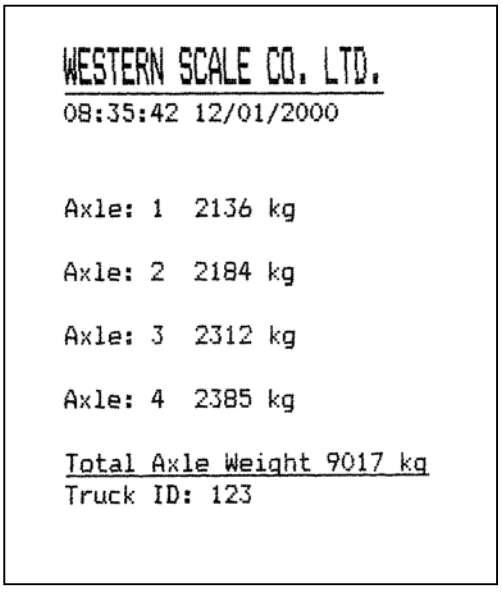
## Ticket 200: Start the axle weighing

**13** CR
**10** LF
**P100** emphasized mode on
**P101** double height ON
**P104** underline ON
**87,69,83,84,69,82,78, 32** "WESTERN"
**83,67,65,76,69, 32,67,79,46, 32,76,84,68,46** "SCALE CO. LTD."

**P108** reset printer fonts
**13** CR
**10** LF

**C20** print time
**32** space
**C21** print date
**C22** Clear the ACC1 register (total axle weights)
**C257** Clear the ACC4 register (axle count)
**C259** increment axle counter to 1
**13** CR
**10** LF
**C100** Assign Print/Select key to ticket 201
**201** ticket 201

**13** CR
**10** LF



### Ticket 201: Prints the Axel # and Axle Weight

**13** CR
**10** LF
**P913** send the string "axle: " to the printer
**C256** print the acc4 as integer number (axle count)
**32,32** " " add some spaces
**C30** print gross weight channel 1
**C25** add gross weight to ACC1
**C259** increment the axle count in ACC4
**13** CR
**10** LF

### Ticket 202: Store total inbound axle weights

After the axles weighing is complete for the inbound truck, the weight can be stored with an ID number. This ticket is assigned to the IN key and stores the total axle weight to an ID number and prints the total axle truck weight along with the ID number. If you enter a used ID number, or an invalid one then the ticket aborts with nothing printed.

**C85** Call the truck in loop function and store the total axle weight in ACC1
(Note: if an invalid or used ID number is entered the ticket aborts here)
**13** CR
**10** LF
**P104** underline ON
**P100** emphasized mode on

**P914** send the string "Total Axle Weight " to the printer
**C24** print the total axle weight
**10** LF
**13** CR
**P108** reset printer fonts

**P906** send the string "Inbound ID"
**C79** print the truck ID number that the weight was stored under

**10** LF
**13** CR
**P114** form feed 9 lines
**9** number of lines

## Ticket 203 Recall stored axle weights and print gross, tare and net

**C86** Call the truck out loop function and retrieve the stored IN weight
(Note: if an invalid or unused ID number is entered the ticket aborts here)
**13** CR
**10** LF
**P104** underline ON
**P100** emphasized mode on

**P914** send the string "Total Axle Weight " to the printer
**C24** print the total axle weight
**10** LF
**13** CR

**P108** reset printer fonts
**P916** send the string "Outbound ID"
**C79** print the truck ID number that the weight was stored under
**10** LF
**13** CR
**10** LF

**P101** double height ON
**P901** send the string "gross weight"
**C74** print the truck loop GROSS weight
**10** LF
**13** CR

**P902** send the string "tare weight "
**C75** print the truck loop TARE weight
**10** LF
**13** CR

**P903** send the string "net weight "
**C76** print the truck loop NET weight

**P108** reset printer fonts
**10** LF
**13** CR
**P114** form feed 9 lines
**9** number of lines