

AP30 MkII

Postal Scale

TECHNICAL MANUAL

Dual Range
2kg x 0.001kg / 30kg x 0.01kg

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1 Introduction

This Calibration manual provides the service technician with various routines, within the 'deep' software, to adjust and set up the AP30MkII postal scale. Access to these routines requires the use of the CAL switch which is concealed behind a label seal. It will be necessary for this seal to be removed when requiring access to these routines.

Note: A suitably qualified technician must test the scale and replace this label before placing the scale back into service.

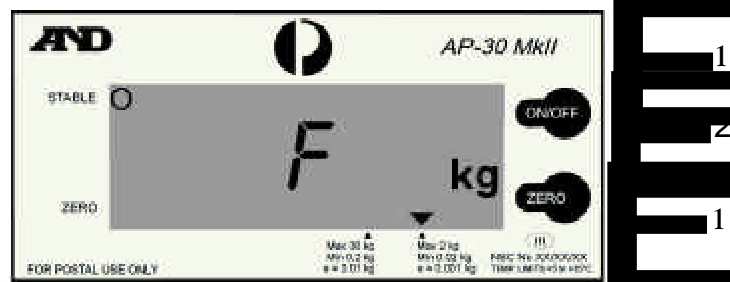
1.1 Accessing the 'Deep' Software

Step 1

Remove the calibration switch label seal, destroying the label if necessary.

Step 2

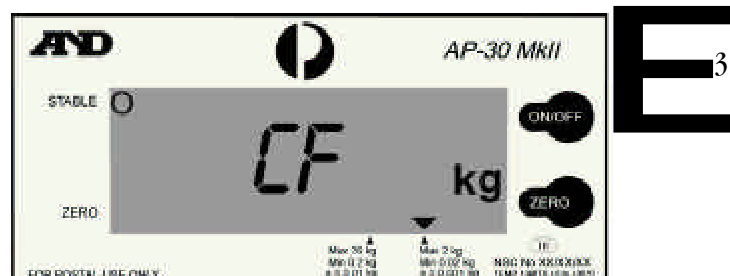
With the scale switched off, depress and hold the CAL and ZERO switches and turn the scale on with the ON/OFF push button. You will need to use a small screwdriver or similar device to depress the CAL switch. Now press the CAL switch again.



The display will show F to indicate the Function setting routine. If you wish to change the Function settings then go to page 3 for details.

Step 3

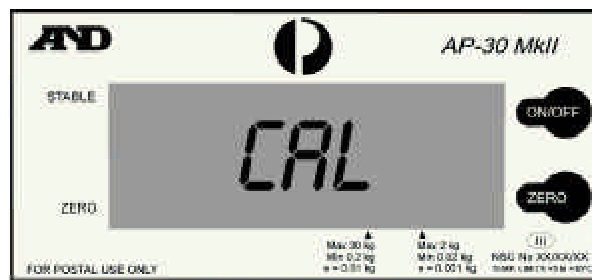
Depress the CAL switch again.



The display will show CF for Cal Function setting routine. If you wish to change the Cal Function settings then go to page 5 for details.

Step 4.

Depress the CAL switch again.



The display will show CAL for the Calibration Routine.
If you wish to perform a full calibration proceed to page 7.

Step 5.

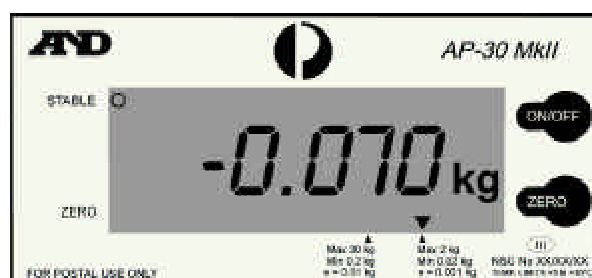
Depress the CAL switch again.



The display will show init for the initialisation routine.
If you wish to perform initialisation proceed to page 13.

Step 6.

Depress the CAL switch again.



The display will show the weight on the pan.
This is the entry to the hardware check routine. If you wish to use this routine proceed to page 16.

Pressing the CAL switch again will return to the F Function setting entry.

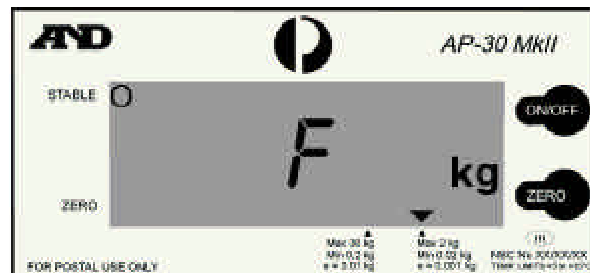
To leave the routine at any time simply press the ON/OFF button twice to turn the scale off then on.

2 F Function Setting

This procedure allows you to select different settings for certain parameters that affect the scale's performance. These settings are known as Function settings and consist of two parts - the Function number and the value set for that function.

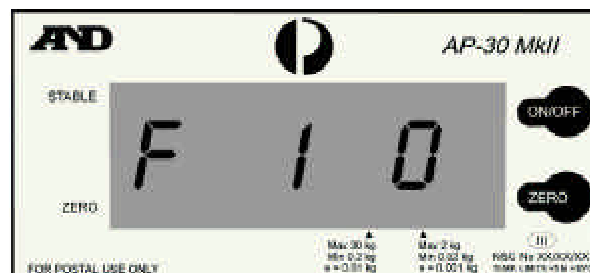
2.1 Setting the F Functions

When you select this routine the display will be showing F.



Step 1.

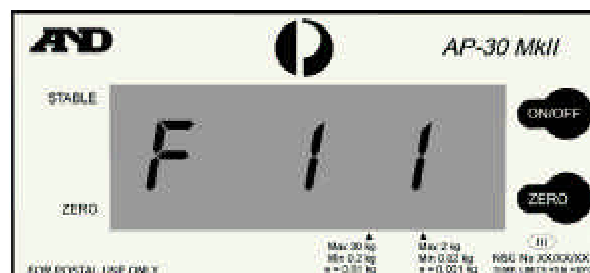
Press the ZERO button to enter the Function setting routine. The display will show F1 and the value previously set.



Step 2.

Use the ZERO switch to select the Function number and the CAL switch to change the function value.

For example pressing the CAL switch once will change the value set for Function F1 to 1.



When you have completed all of your required function settings press the ZERO switch until End is displayed.



Now press the ON/OFF switch twice to return to the normal weighing mode.

2.2 The F Function Table

F	#	Description
1	*	Battery saving will turn the scale off after 5 minutes displaying zero.
	0	Battery saving is turned off.
	1	Battery saving is turned on.
2	*	The baud rate of the serial data, EPOS, interface can be set.
	0	2400 b.p.s.
	1	4800 b.p.s.
	2	9600 b.p.s.
3	*	The output mode for the serial data interface can be selected.
	0	Stream mode (Used for Australia Post).
	1	Command mode (Used for NZ post).
4	*	The averaging algorithm can be selected.
	0	Normal weighing - this must be selected for postal scales.
	1	People weighing mode.
	2	Animal weighing mode.
5	*	The RS232C serial data transmission format can be selected.
	0	Format 1. (Variable length weight (g) leading zeros suppressed.)
	1	Format 2. (A&D standard format for scales and balances)

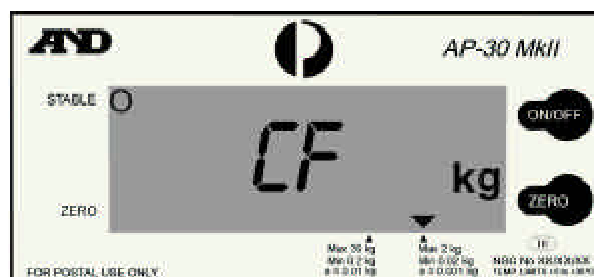
* Factory default setting.

3 CF Function Setting

This procedure allows you to select different settings for certain calibration parameters that affect the scale's performance. These settings are known as Calibration Function settings and consist of two parts - the CF Function number and the value set for that function.

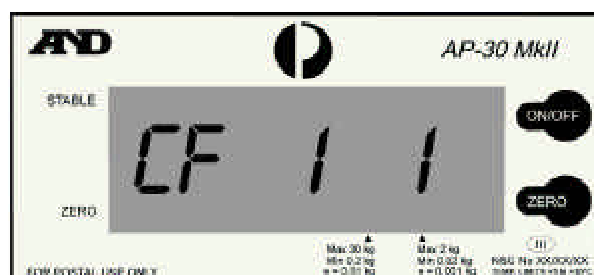
3.1 Setting the CF Functions

When you select this routine the display will be showing CF.



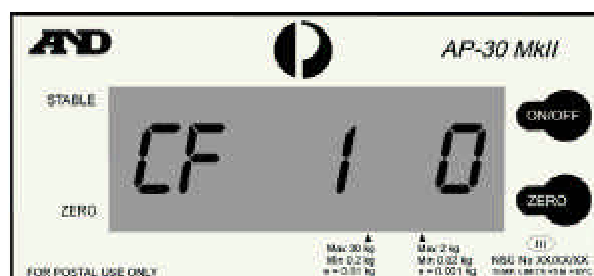
Step 1.

Press the ZERO button to enter the CF Function setting routine. The display will show CF1 and the value previously set.

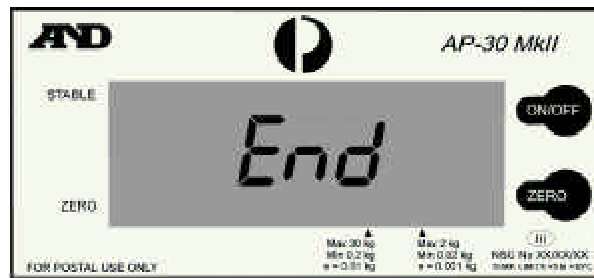


Step 2.

Use the ZERO switch to select the CF Function number and the CAL switch to change the function value. For example pressing the CAL switch once will change the value set for Function CF1 to 0.



When you have completed all of your required CF Function settings press the ZERO switch until End is displayed.



Now press the ON/OFF switch twice to return to the normal weighing mode.

3.2 The CF Function Table

CF	#	Description
1	0	<i>Zero tracking can be disabled.</i> Disable zero tracking
	1*	Enable zero tracking
2	*	<i>The style of the decimal point can be selected.</i>
	0	Use a point (.)
	1	Use a comma (,)
3	*	<i>Reserved for selecting the scale capacity.</i> Set at 30kg full capacity

* Factory default setting.

4 Calibration

Calibration is the adjustment procedure to ensure the scale weighs correctly.

There are 3 steps to calibration :-

Gravity acceleration correction.

When a calibrated scale is moved to a distant place the gravity value at the new destination may be different to that where the scale was calibrated. This difference in gravity value may affect the accuracy of the scale. If you revise the 'gravity setting' of the scale it can be made to read accurately without recalibrating. Refer to the 'gravity acceleration table' on the following page.

Calibration of the Zero point :-

When there is nothing on the weighing pan the zero calibration routine informs the scale that this is the true zero point.

This zero point is the fundamental starting point to weighing and is shown when the Zero mark is lit.

Span Calibration :-

When a known standard mass is placed onto the scale the span calibration routine informs the scale that this is a known mass.

Afterward the scale can accurately weigh any mass within the scale's capacity.

For best results use a mass heavier than two thirds of the scale capacity.

Cautions

Calibrate the scale using a mass of OIML class F2 or equivalent.

Periodically check the accuracy of weighing. Calibrate the scale if it is moved to another location or the environment has changed.

It is not necessary to set the gravity acceleration correction if the scale is to be calibrated, with a standard mass, at the place where the scale is to be used.

4.1 The Gravity Acceleration Table

Amsterdam	9.813	m/s ²	Manila	9.784 m/s ²
Athens	9.800	m/s ²	Melbourne	9.800 m/s ²
Auckland NZ	9.799	m/s ²	Mexico	9.779 m/s ²
Bangkok	9.783	m/s ²	Milan	9.806 m/s ²
Birmingham	9.813	m/s ²	New York	9.802 m/s ²
Brussels	9.811	m/s ²	Oslo	9.819 m/s ²
Buenos Aires	9.797	m/s ²	Ottawa	9.806 m/s ²
Calcutta	9.788	m/s ²	Paris	9.809 m/s ²
Chicago	9.803	m/s ²	Rio de Janeiro	9.788 m/s ²
Copenhagen	9.815	m/s ²	Rome	9.803 m/s ²
Cyprus	9.797	m/s ²	San Francisco	9.800 m/s ²
Djakarta	9.781	m/s ²	Singapore	9.781 m/s ²
Frankfurt	9.810	m/s ²	Stockholm	9.818 m/s ²
Glasgow	9.816	m/s ²	Sydney	9.797 m/s ²
Havana	9.788	m/s ²	Taiwan	9.788 m/s ²
Helsinki	9.819	m/s ²	Taipei	9.790 m/s ²
	9.7903	m/s ²		9.791 m/s ²
	9.081	m/s ²		9.809 m/s ²
Greenwich)n	9.120	m/s ²		9.881 m/s ²
	9.916	m/s ²		9.803 m/s ²
	9.010	m/s ²		9.097 m/s

4.2 Correction of Gravity Acceleration

The gravity acceleration figure is set using the following routine.

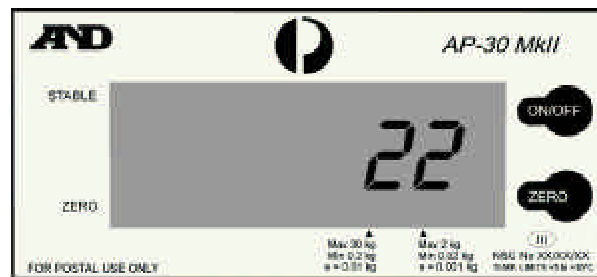
To ascertain the correct figure to set consult the chart on the previous page.

When you enter this routine the display will be showing CAL.



Step 1.

Press the ZERO switch. The display will show the last entered ambient temperature.



Step 2.

Measure the ambient temperature of the workshop to an accuracy of ± 1 degrees Celsius.

Step 3.

Set the displayed value to match the measured value using the CAL switch to first set the, flashing, unit figure. Then use the ZERO switch to select the tens figure and the CAL key to set it's value.

Step 4.

Press the ZERO switch to advance to the gravity value adjustment routine. The display will show the last entered gravity adjustment value.



Step 5.

Refer to the gravity acceleration table on page 8 and select the required setting.

Step 6.

Set this value as follows:-

Use the CAL switch to set the value of the flashing digit.

Use the ZERO button to move to the next digit.

Note that the value will be stored when the ZERO key is pressed with the most significant digit flashing.

4.3 Calibration of the Zero point

Calibration of the Zero point :-

When there is nothing on the weighing pan the zero calibration routine informs the scale that this is the true zero point.

This zero point is the fundamental starting point to weighing and is shown when the Zero mark is lit.

CAUTION: This procedure must only be carried out by a qualified scale technician.

Step 1

Ensure that the scale is level - adjust the levelling legs if necessary.

Step 2

Warm up the scale, by leaving it switched on, for at least 30 minutes before performing this procedure.

Step 3

Remove the calibration switch label.

Step 4

With the scale on and nothing on the weigh pan press and hold the calibration switch until the display shows C AL 0.

Note: You will need a small implement, such as a screwdriver or nail, to insert into the recess to press the calibration switch.

Step 5

Ensure that the STABLE indicator is lit and then press the ZERO switch.



4.4 Calibration of Span

Span Calibration :-

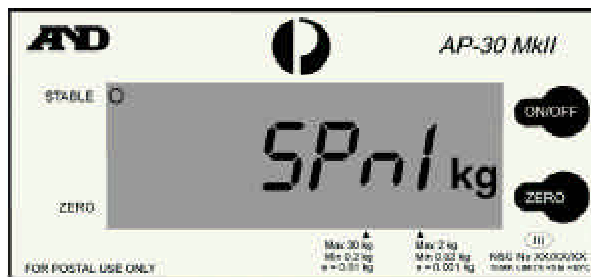
When a known standard mass is placed onto the scale the span calibration routine informs the scale that this is a known mass.

Afterwards the scale can accurately weigh any mass within the scale's capacity.

For best results use a mass heavier than two thirds of the scale capacity.

Step 1

The display will show SPn 1 for a few seconds and then will show 30.000kg as a suggested calibration mass.



Step 2

If you intend calibrating with less than the maximum mass then press the calibration switch to select from 10.000 / 20.000 / 30.000kg.

Step 3

Place the selected mass onto the weigh pan, wait for the STABLE indicator to light and then press the ZERO switch.

Step 4

The scale will memorise the mass and, if the calibration was successful, will then display End.

Step 5

Press the calibration switch again to store the results into the scale.

4.5 Calibration Errors

The display may show an error message if a problem occurs during the calibration sequence.

ca1 e : The mass on the pan is too large.

This can occur if the pan is not empty when trying to perform a zero calibration.

This can occur if the mass on the pan is too high for the span mass selected. For example if you select 10.000kg as the span mass and then place 30kg onto the pan for the calibration.

-ca1 e : The mass on the pan is too small.

This can occur if you press the ZERO switch, after selecting the desired calibration mass, but before placing the mass onto the pan.

5 Initialisation

WARNING

ENTERING THESE ROUTINES WILL DESTROY THE WEIGHING
AND TEMPERATURE COMPENSATION VALUES

The init routines are provided to the technician for the purposes of re-establishing the scale after fault finding and repair.

The display will be showing init on selection of these routines.



5.1 Weight Display

Press the ZERO switch to enter the routines. The display will show a number with the kg unit lit. This number shows the weight on the pan.



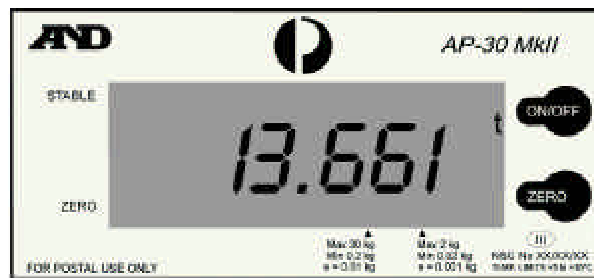
5.2 A/D Raw Count

Press the ZERO switch and the display will change to show a number with the pcs unit lit. This number shows the A/D raw count.



5.3 Temperature A/D Counts

Press the ZERO switch and the display will change to show a number with the t unit lit. This number shows the temperature A/D count.



5.4 Internal Counts

Press the ZERO switch and the display will change to show a number with the STABLE annunciator lit. This number shows the internal counts.



5.5 Display Check

Press the ZERO switch and the display will change to show CHEC. This is the entry to the display and keys check routine.



Step 1.

To enter the check routine press the CAL switch and the display check will commence. After all 8's has been displayed the display will briefly show the software revision number in the form 101

To leave the init routines at this stage, without performing the display check press the ON/OFF switch.

5.6 Switch Check

After the display test has completed the display will show HI OK LO.

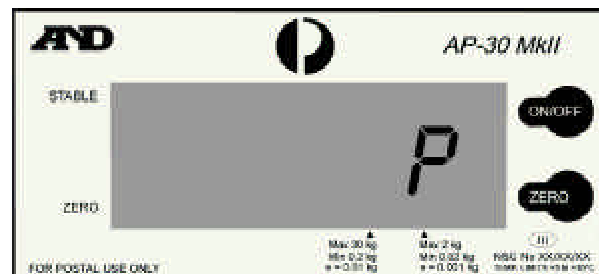


Step1.

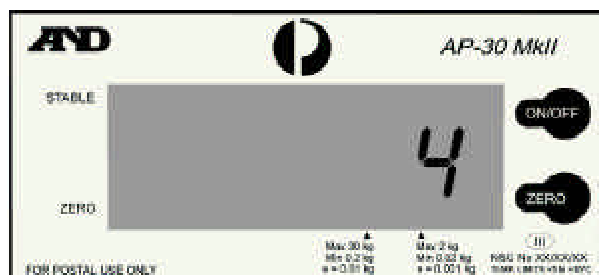
To exit the display test without performing the switch test then press the ON/OFF switch.

To enter the switch test routine press the ZERO switch. The display will go blank. Now if one of the switches is pressed then the display will change as shown below.

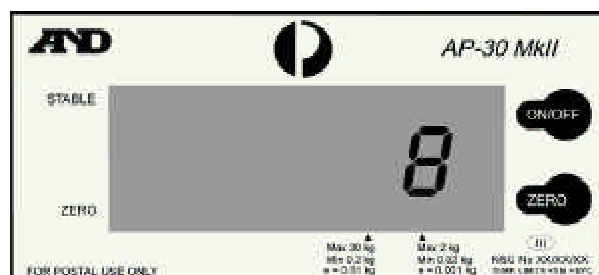
ON/OFF switch pressed.



ZERO switch pressed.

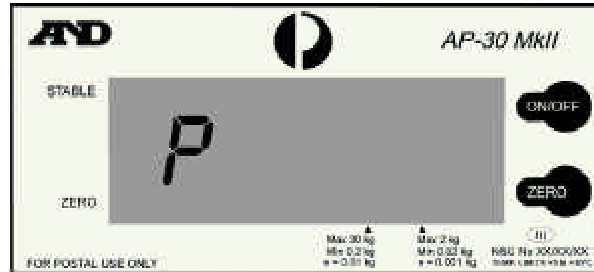


CAL switch pressed.



Step 2.

Exit the test routine by pressing and holding the ON/OFF switch for a period of approximately 5 seconds.
The display will show P on the left hand side of the screen.



Either :-

- * Press the ON/OFF switch to turn the scale off.

or

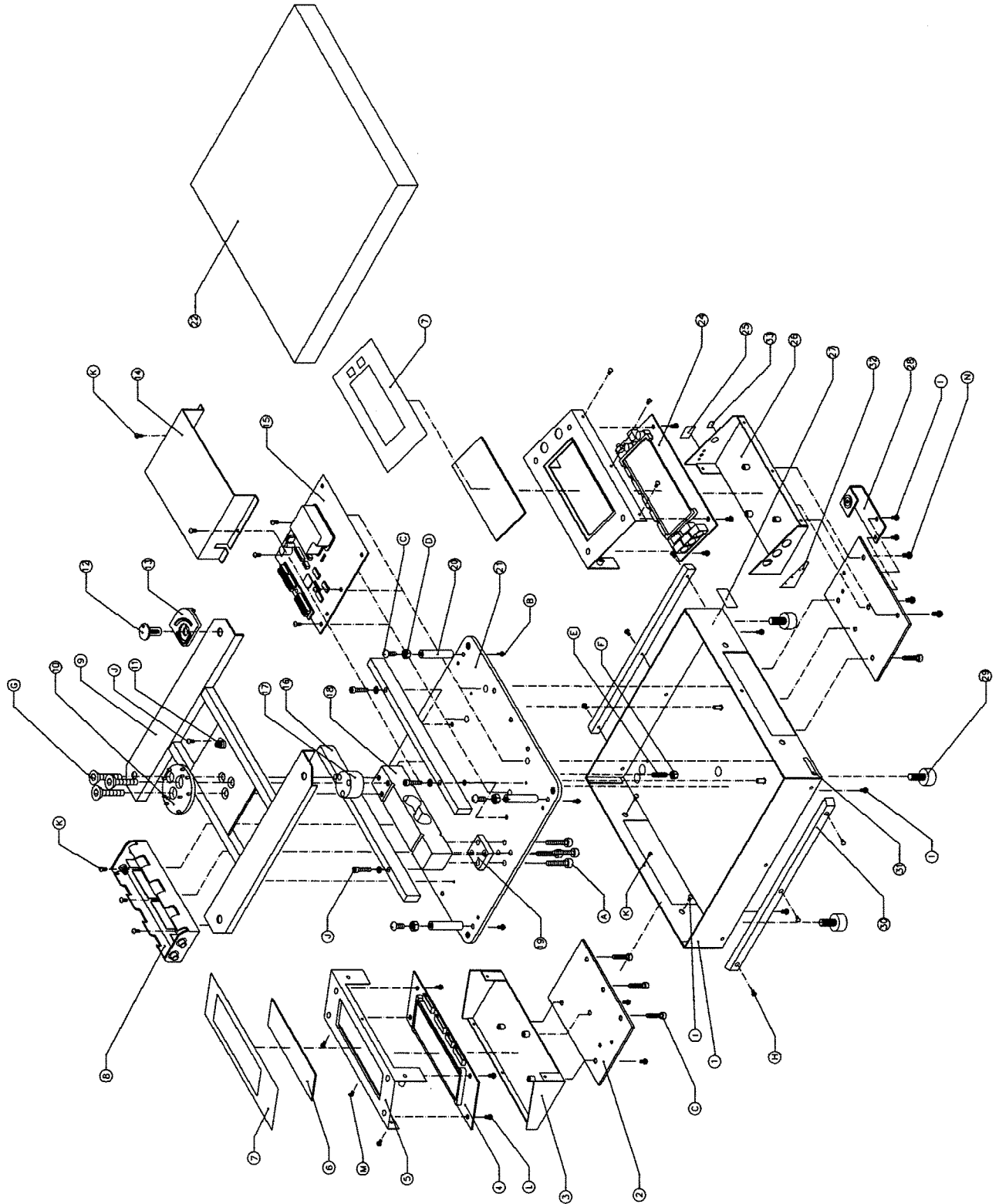
- * Press the ZERO switch to exit the key check routine. The display will show end.



Now press ZERO again to return to the Init menu options of weight display / raw counts / temperature A/D counts / Internal counts / Display check.

6 Drawings and Parts Lists

6.1 Exploded Diagram

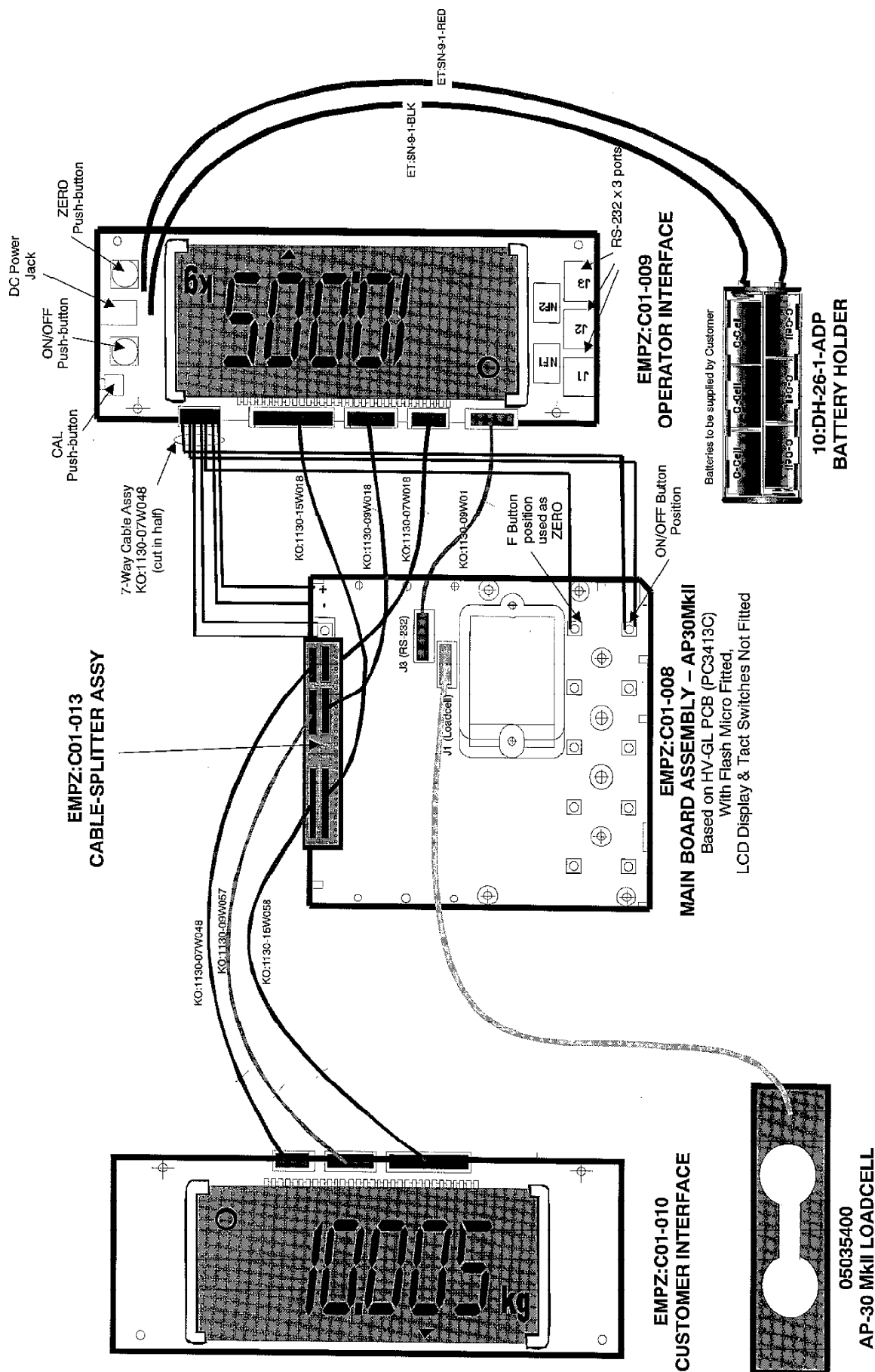


6.1 Mechanical Parts

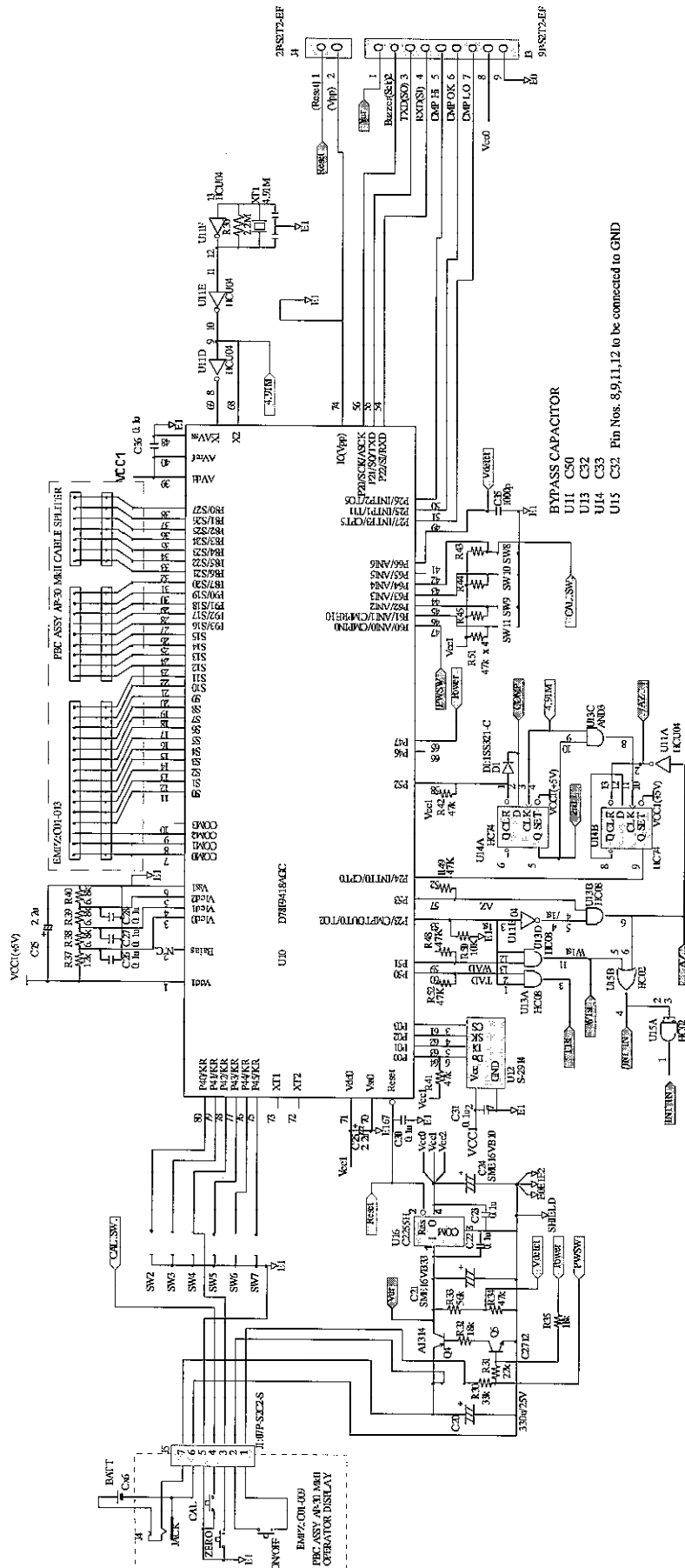
Ref	Description	Part Number	Qty.
1.	Base cover - complete	MC07811.001	1
2.	Indicator support	MC07809.001	2
3.	Indicator base, customer side - complete	MC07810.001	1
4.	Display P.C.B., customer side	EMPZ:C01-010	1
5.	Indicator top panel	MC07808.001	2
6.	Display filter	MC07807.020	2
7.	Keysheet label kit		1
8.	Battery holder	10:DH-26-1-ADP	1
9.	Platform support frame - complete	MC07804.000	1
10.	Centre pad	MC07654.021	1
11.	Earth spring	15:4007471A	1
12.	Corner pad rivet	MC07650.020	4
13.	Corner pad	MC07652.021	4
14.	Main board cover	MC07805.001	1
15.	Main board assembly	EMPZ:C01-009	1
16.	Reinforcing bar	MC07818.001	2
17.	Platform support spacer	MC07822.001	1
18.	Loadcell (30kg) AP30 MkII	05035400	1
19.	Loadcell spacer	MC07803.001	1
20.	Corner overload stop	MC07802.001	4
21.	Base plate	MC07801.001	1
22.	Platform	MC07806.005	1
23.	Not used		
24.	Display p.c.b. - operator side	EMPZ:C01-009	1
25.	Cal label		1
26.	Indicator base, operator side - complete		1
27.	'Instrument must be level' label		1
28.	Level bubble holder, complete		1
29.	Levelling leg	MC07823.000	4
30.	Bumper strip	MC07817.013	2
31.	Serial number label	MC50100.000	1
32.	RS232C label		1
33.	DC 9V label		1
A	M6 x 25 socket head cap screw	FSM060011	4
B	M5 x 10 Pan head X/rec MT screw	FSM050003	4
C	M5 x 15 socket head cap screw	FSM050006	10
D	M5 full nut	FNM050001	4
E	M6 x 20 Socket set screw		1
F	M6 full nut	FNM060004	1
G	M6 x 30 countersunk head socket screw	FSM060004	3
H	M3 x 12 countersunk head X/rec screw, Ni		6
I	M4 x 8 pan head SEMS ZP Ni	FSM040011	10
J	M5 x 25 socket head cap screw	FSM050002	5
K	M3 x 6 pan head SEMS ZP Ni	FSM030003	7
L	M3 x 8 pan head SEMS ZP Ni	FSM030040	12
M	M3 x 6 button head MT screw s/s	FSM030005	6
N	M4 x 10 pan head X/rec MT screw s/s	FSM040007	6

6.2 Electrical Diagrams

Inter-connection



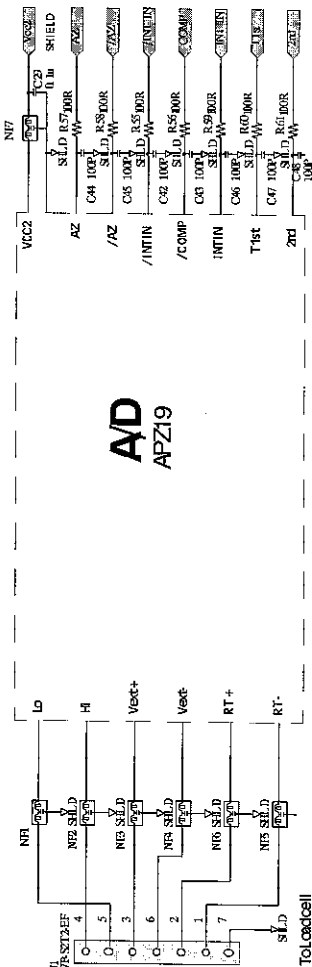
6.3 Main board circuit



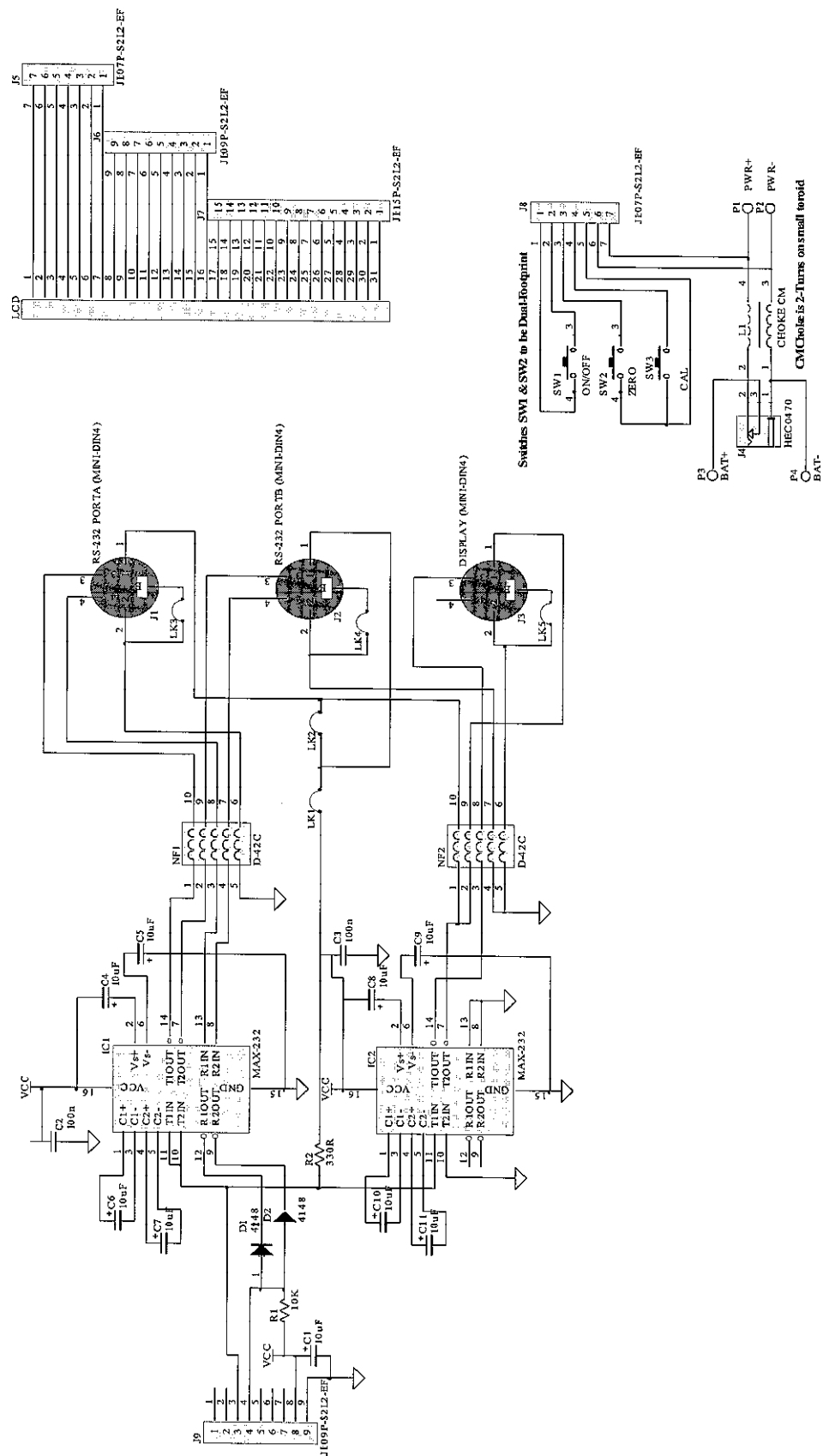
NOTE: ONLY EARTH IN

AD GND = SHIELD GND
NOTE: ONLY EARTH IN
ONE LOCATION.

Vcc0 E0 CPU
Vcc1 E1 Logic
Vcc2 E2 AD

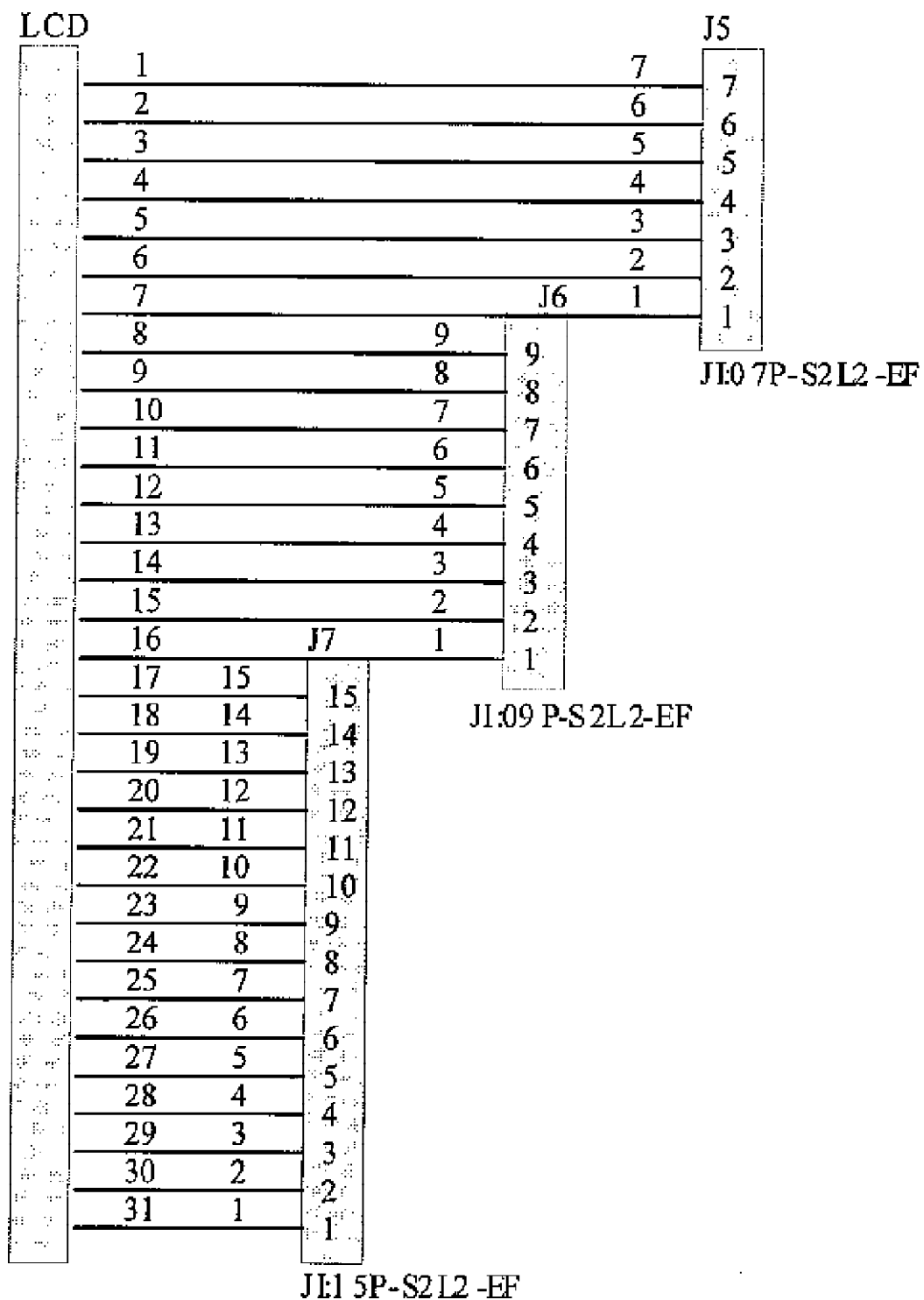


6.4 Operator LCD Display PCB EMPZ:C01-009

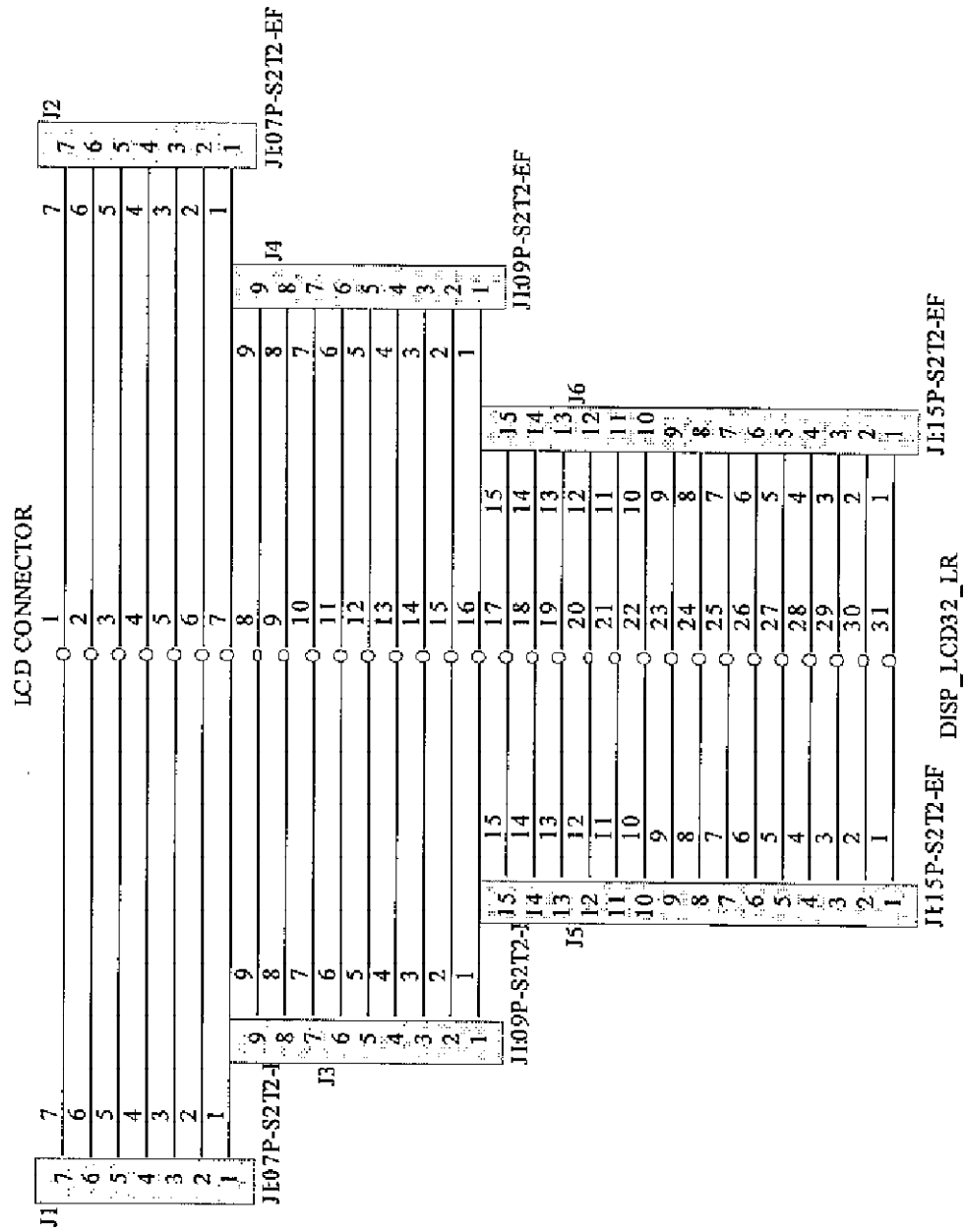


6.5 Customer LCD Display PCB

EMPZ:C01-010



6.6 Cable splitter PCB EMPZ:C01-013





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