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Service Manual
TPCJ-A

KERN PCJ

Type TPCJ-A
Version 1.0
10/2023
GB



GB

KERN TPCJ-A

Version 1.0 – 10/2023

Servicemanual

Table of contents

1 Basic Information 3

2 Introduction 3

3 Feature overview 4

4 Service Menu 5

4.1 Adjustment procedure 6

4.2 Linearization Procedure 7

5 Maintenance 8

5.1 Service, maintenance 8

5.2 Error Codes 8

5.3 Trouble Shooting 9

6 Exchange of components 10

6.1 Spare parts list 10

6.2 Opening the device 10

6.3 Exchange of components 10

7 Technical drawings 12

7.1 Wiring Diagram 12

7.2 Component Diagram 12

7.3 Functional Block Diagram 13

7.4 Schematic Diagram 13

1 Basic Information

The device must be repaired only by trained specialist staff or personnel with professional formation (such as a repair-specialist accredited by law concerning verification). The service manual is obligatory for repair work. After repair, original conditions of the device must be restored. Only original spare parts should be used.

2 Introduction

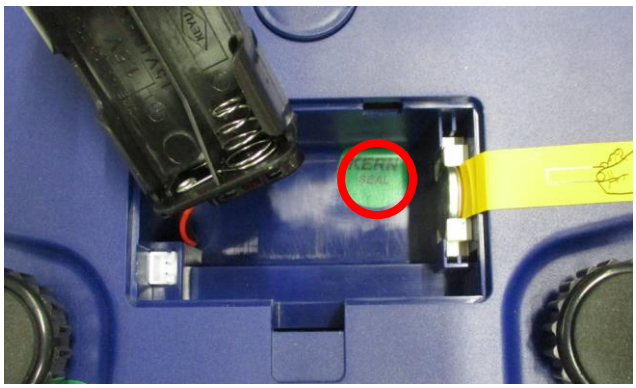
This service manual covers the TPCJ-A scale series and is edited for the authorized servicing personnel.
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3 Feature overview

- Large LCD, 7-digit H=21mm, VA=89x30mm, with white backlight
- Stable, zero, battery level, gloss/net weight and Hi/OK/LO indications
- Weighing unit: kg, g, ct, %, pcs, FFA
- 5 button operated: On/Off, Change, Print, Zero, Tare
- Built-in internal calibration weight, operated by turning knob
- Under floor weighing
- Leveling feet and level bubble
- Tare up to Max
- Pre-Tare function
- Percentage weighing function
- Check weighing function
- Piece counting function
- Display Hold function
- Print function with Sum Memory
- Application menu
- Setup menu
- Service menu to be activated by internal verification button
- Alibi Memory installed
- Real time clock installed
- Kern Communication Protocol (KCP
- Kern Universal Port (KUP) interface, VGA-15 female connector
- Optional external RS-232 interface / Signal light through KUP
- Optional external USB device interface through KUP
- Optional external WiFi interface through KUP
- Optional external Bluetooth BLE interface through KUP
- Optional external Ethernet interface through KUP
- Multi-Plug (EU/UK/US) Power adaptor, 5.9V 1A
- Optional Alkaline Batteries, 4xAA size
- Optional rechargeable battery, Li-ion 3.7V 3700mAH

4 Service Menu

Press the internal verification button to enter service menu.



Press ➔ button to select / confirm / shift right
Press ← button to go back / exit / shift left
Press ↓ button to scroll down / decrease digit value
Press ↑ button to scroll up / increase digit value

AdJuSt	adjustment
cAL	adjustment function (as in User Menu)
cAL int	adjustment by internal weight: ZEro, PutLd, UA it, rENULd...
cALEHt	adjustment at predefined weight: ZEro, PutLd, UA it...
cALoUr	overwrite the internal adjustment weight: ZEro, PutLd, 1000, rENULd, Pt iLd, rENuLd, SuccES
cALt inE	set adjustment after 1h, 2h, 4h, 8h*. CAL will be flashing
cALGLP	select printing calibration protocol on/off*.
tENP.cAL	Measure 500/5000g weight at Hi/Lo temperature
LotENP	Measure 500/5000g weight at Lo temperature
hitENP	Measure 500/5000g weight at Hi temperature
rESEt	reset temperature data
tENP.chG	set forced adjustment @4°C change on*/off
L inEAr	Linearization
3Po int	3 points + internal weight
5Po int	5 points + internal weight
ZEro	zero calibration (not yet available)
crEEP	creep compensation (at load) (not yet available)
oUErLd	overload counter
nEn	view counter
oUrEr	erase overload count
tYP inF	show/set model information
UEr iFY	EutEc on / off
conF iG	show/set type configuration
MEMorY	no/yes to disable memory if memory unavailable during use.
rEcord	number of records in memory
1St id	ID of starting memory
in it	Initialize memory
inFo	information querry
SEr iAL	Serial number
UEr	Software version b 1.5.0 3
UErA	Software version approved A 1.0.0 1
AdUALu	A/D value
rESEt	reset
ALL	reset all

4.1 Adjustment procedure

(UEr iFY = oFF)

1. Turn the scale on and allow the scale to acclimatize and stabilize for sufficient time.
2. Press and hold the ON/OFF and TARE key to enter setup menu. Display shows CAL.
3. Press ➔, display show CALEHt.
4. Press ➔, display show the first selectable calibration weight.
5. Press ↓ or ↑ to scroll to other selectable calibration weights, see below table.

Type	Calibration Weight (g)
TPCJ 600-2M-A	150 / 300 / 600
TPCJ 6000-1M-A	1500 / 3000 / 6000

6. Press ➔, display show ZEro, then PtLd, then display calibration weight.
7. Place the calibration weight onto the scale gently.
8. Press ➔, display show HA it, then rEMULd. Remove the calibration weight. Scale will return to the weigh mode and display weight.

Note:

- In step 8, in case HronG is displayed, this indicates a calibration error. Turn the scale off and then on and repeat the procedures.
- Press ↓↑ to scroll. Press ← to esc/exit. Press ➔ to enter/confirm.
- There is an alternative way to enter the CALEHt menu through the service menu.

(UEr iFY = on)

Adjustment can be activated by:

- Turning the internal weight knob clockwise to lower down the weight.
  Display will show CAL int, HA it, rEMULd.
  Turn the internal weight knob counter-clockwise to raise up the weight, display will return to weight mode once adjustment completed.

- Power up at battery operation mode
- Power up after power adaptor disconnected
- Adjustment Timer set by CALt iME
- Temperature change enabled by tEMPchG = on
  CAL icon will be flashing, and CAL int - PutLd will be displayed alternatively.
  Load the internal weight as above to complete the adjustment.

- AdJuSt => CAL => CAL int in service menu
  Load the internal weight as above to complete the adjustment.

Always allow the scale to acclimatize and stabilize for sufficient time before calibration.

4.2 Linearization Procedure

1. Allow the scale to acclimatize and stabilize for sufficient time.
2. Turn on the scale, press verification button to enter the service menu. Display shows AdJuSt.
3. Press ↓ or ↑ to scroll to tYP inF. Press ➔, display show UEr iFY. Set verification on if needed
4. Press ↓ or ↑ to scroll to the model in the table below.

Type	Display
TPCJ 600-2M-A	600-2M
TPCJ 6000-1M-A	6000- 1M

5. Press ➔ to confirm model selection. Display will turn off.
6. Turn on the scale, press verification button to enter the service menu again. Display shows AdJUSt.
7. Press ➔, display show cAL.
8. Press ↓ or ↑ to scroll to L inEAr. Press ➔, display show 3Po int.
9. Press ↓ or ↑ to scroll to 5Po int or 3Po int.
10. Press ➔, display show HA it, then ZEro, then PutLd, then the standard weight for the first point.
11. Place the calibration weight onto the scale gently.
12. Press ➔, display show HA it, then display show PutLd and the calibration weight for the next point.
13. Repeat step 11 and 12 until display show SuccES.

Note:
Make sure the standard weights below are available for linearization.

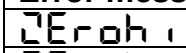
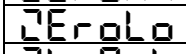
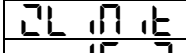
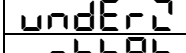
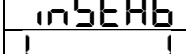
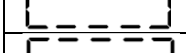
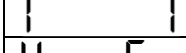
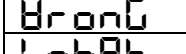
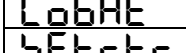
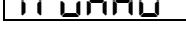
Type	Calibration Weight (g)	
	3-point	5-point
TPCJ 600-2M-A	200, 600	100, 200, 400, 600
TPCJ 6000-1M-A	2000, 6000	1000, 2000, 4000, 6000

5 Maintenance

5.1 Service, maintenance

The appliance may only be opened by trained service technicians who are authorized by KERN.
Disconnect the scales before opening.

5.2 Error Codes

Error message	Explanation
	Zero too high at power up
	Zero too low at power up
	Over zeroing range
	Under zeroing range
	Unstable weight
	Over weight
	Under weight
	Adjustment error
	Batteries / rechargeable battery exhausted
	Real time clock incorrect / not set
	Scale memory failed / not detected

5.3 Trouble Shooting

Power on

↓

Full Segments?

If no display,

- check battery / mains power,
- check connection between battery / SMPS board —main board.

If missing segments,

- check LCD pins; damage of LCD.

↓

Display Zero?

If display [LO bAt], check battery >4.2V, SMPS board ~6V.

If display [ZEroh ı] or [ZEroLo] check the load cell connections, load cell damaged?

If display [ınStAb] weight platform, overload stopper, loadcell and wires terminal, environment and stable table.

If display [SEt rtc] check RTC battery, set clock.

↓

Proper readout?

If unstable reading, check weight platform, overload stoppers, loadcell and wires terminal, environment and stable table.

If always zero, check ADC. Linearization if necessary.

↓

Correct reading?

If not accurate, perform adjustment or linearization.

If cannot reach full capacity, check tray top, overload stopper, loadcell.

↓

Buttons functioning?

If some buttons not working, check the keyboard FPC connection. Replace keyboard if needed.

↓

Interface functioning?

If interface not working, check installation and the connection wires.

↓

Normal operation.

6 Exchange of components

6.1 Spare parts list

RTPCJ-2001	Main board – TPCJ
RTPCJ-4001	Overlay TPCJ 600-2M-A
RTPCJ-4002	Overlay TPCJ 6000-1M-A
RTPCB-8001	Adjustable foot
RTPCB-8003	Battery door
RTPCB-8002	Battery holder 4xAA
RTPCB-6001	Buffer weight stand
RTPCB-8004	Hook hole cover
RTPCB-8005	S-shape hook
RTPCB-6003	Stainless steel cover 150x170mm
RTPCB-6002	Stainless steel cover 130x130mm
TYBA-A12-A	Working cover
TYKA-24-A	Power adaptor 5.9V 1A 3-plug with UF-70B

6.2 Opening the device

To open / close the device, unscrew / screw in the 4 tap. screws, M3x10, on the bottom housing.
Note: There are 4 snaps holding the top/bottom housing together. Need certain force to pull the housing apart.

6.3 Exchange of components

Below components can be replaced without opening the device:

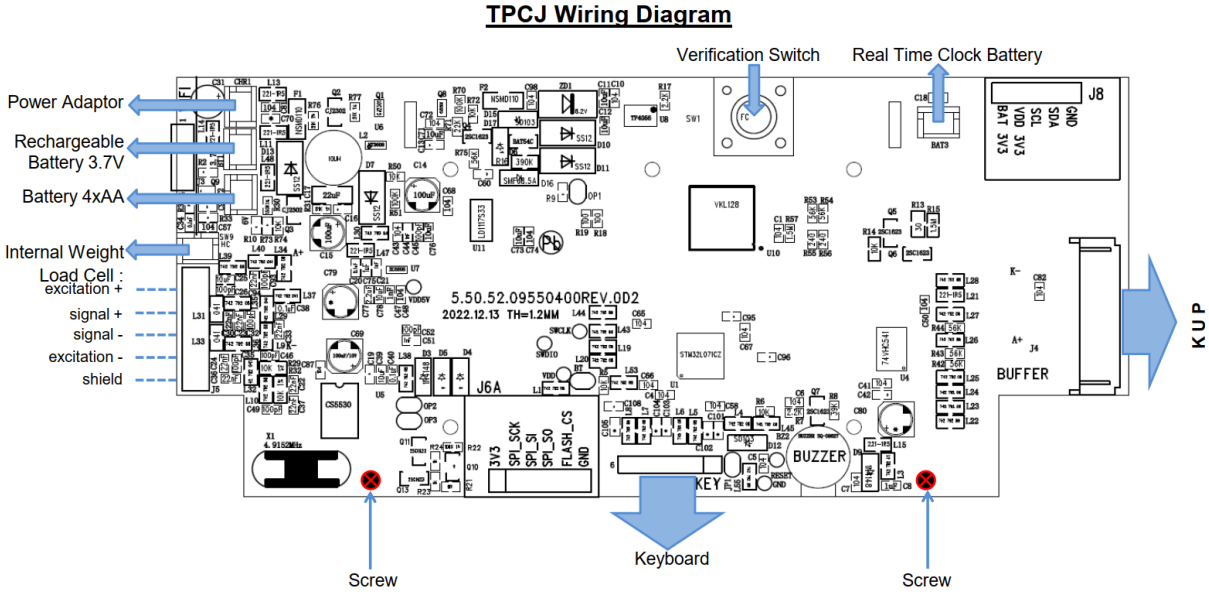
RTPCJ-4001	Overlay TPCJ 600-2M-A
RTPCJ-4002	Overlay TPCJ 6000-1M-A
RTPCB-8001	Adjustable foot
RTPCB-8003	Battery door
RTPCB-8002	Battery holder 4xAA
RTPCB-6001	Buffer weight stand
RTPCB-8004	Hook hole cover
RTPCB-8005	S-shape hook
RTPCB-6003	Stainless steel cover 150x170mm
RTPCB-6002	Stainless steel cover 130x130mm
TYBA-A12-A	Working cover
TYKA-24-A	Power adaptor 5.9V 1A 3-plug with UF-70B

Replacement of the main board:

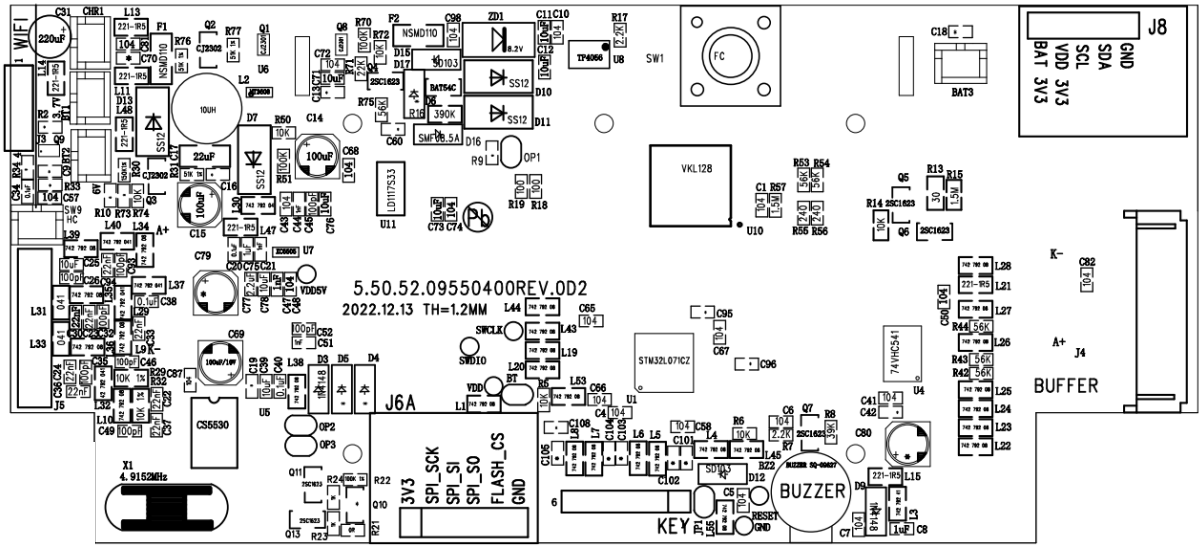
1. Open the device by removing the 4 screws and top housing
2. Disconnect the connections to the main board
3. Remove the 2 screws
4. Replace a new main board
5. Fix the main board with the 2 screws
6. Connect the main board as per the Wiring Diagram
7. Install the 4 screws to close the device
8. Perform Linearization and Adjustment

7 Technical drawings

7.1 Wiring Diagram

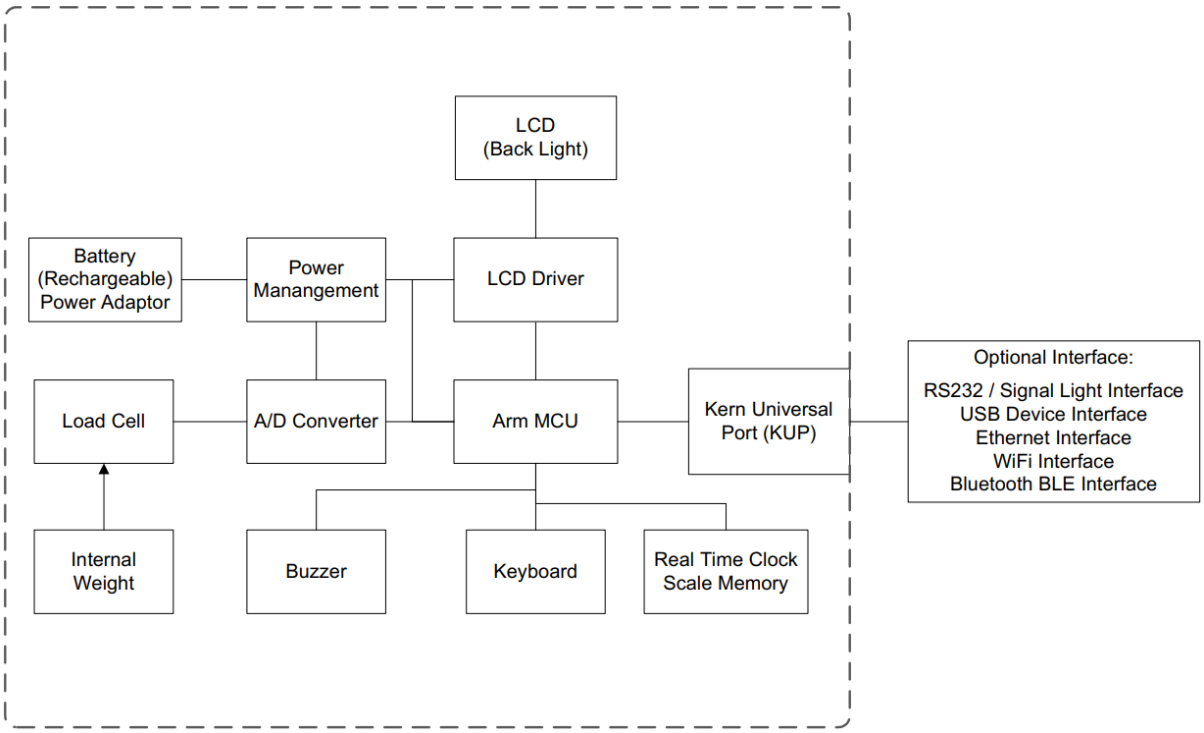


7.2 Component Diagram

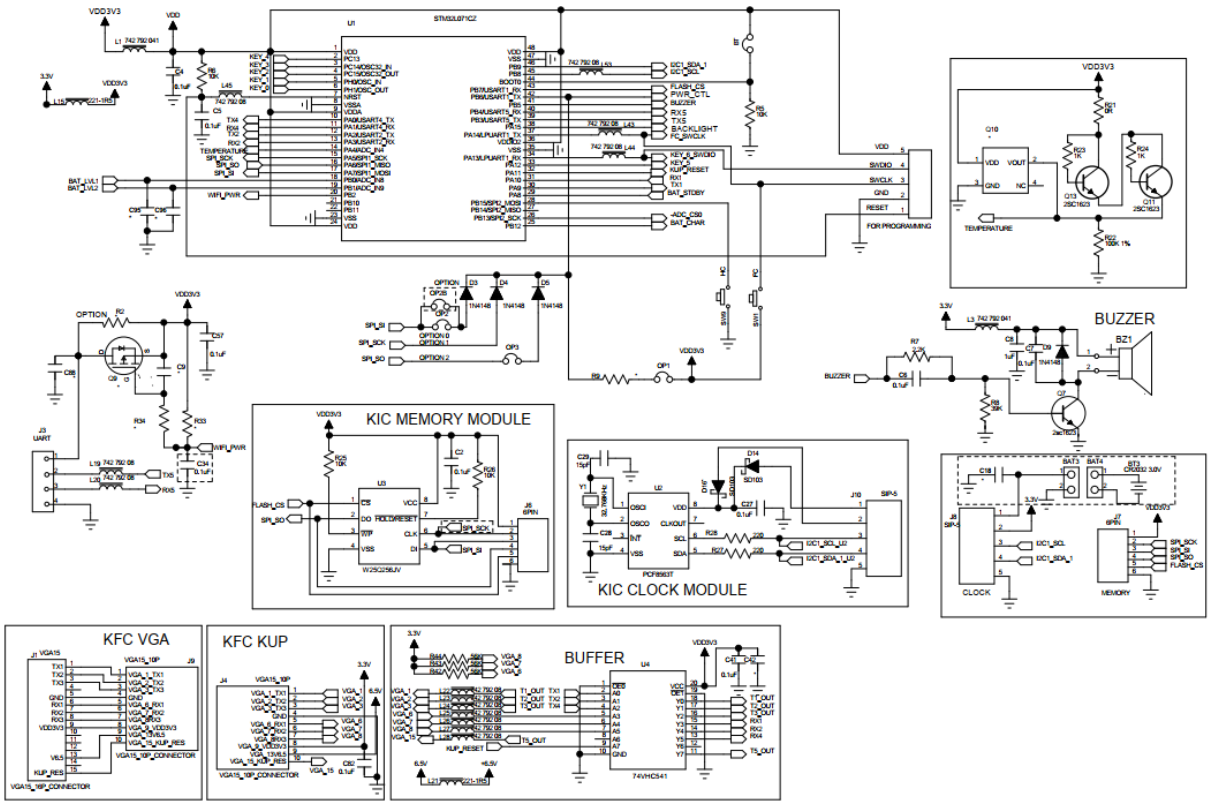


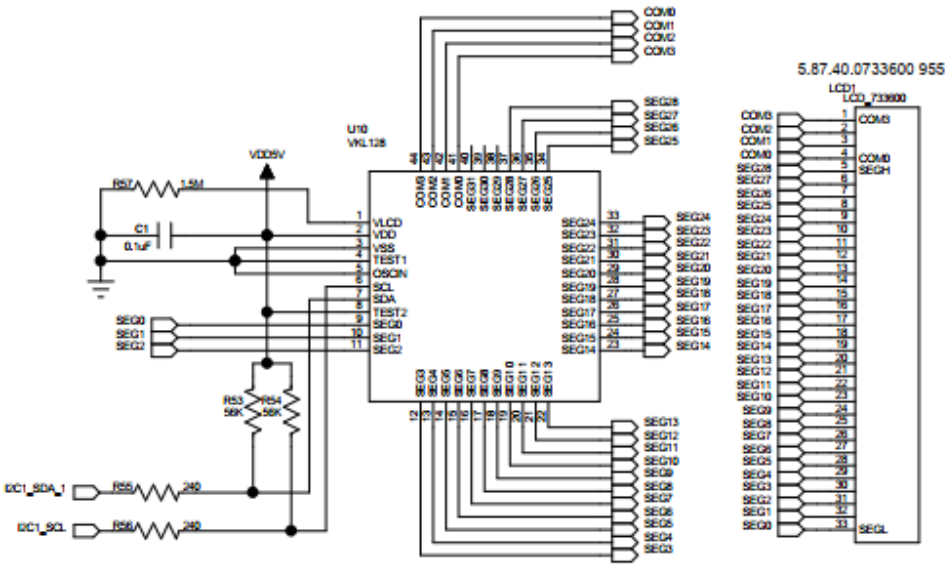
7.3 Functional Block Diagram

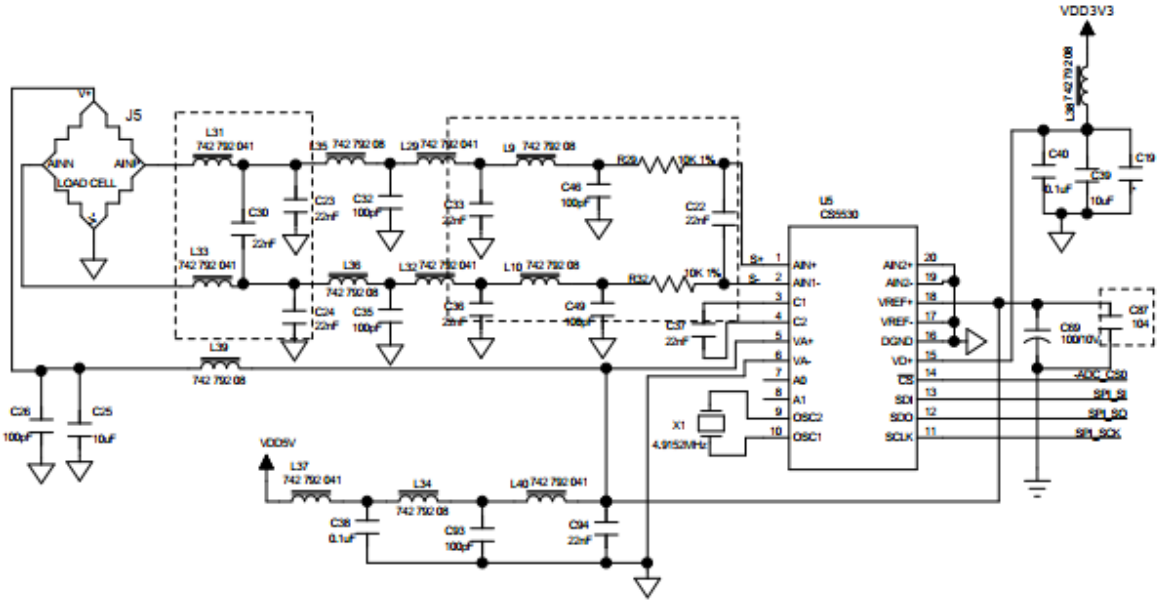
TPCJ Functional Block Diagram

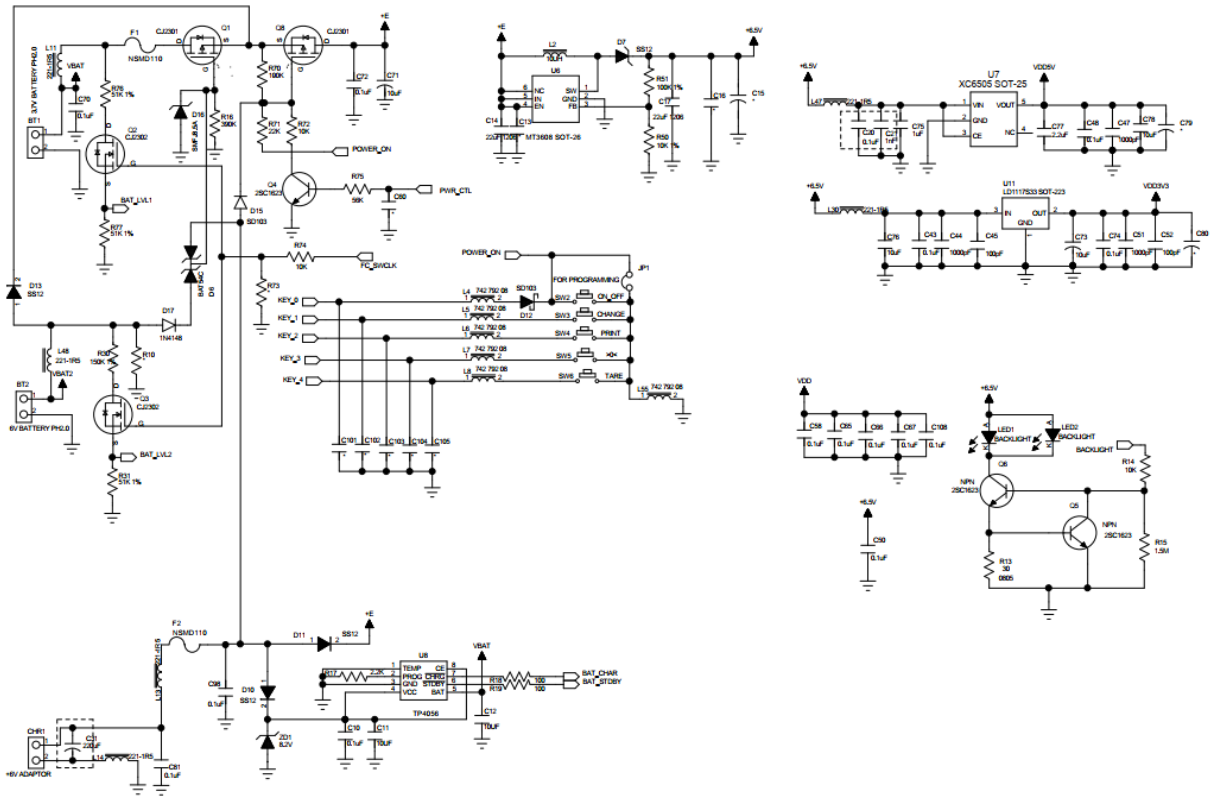


7.4 Schematic Diagram




5.87.40.0733600 955
U10
VKL128
LCD1
LCD_733600
VDD5V
R57
1.5M
C1
0.1uF
R53
56K
R54
56K
I2C1_SDA_1
I2C1_SCL
R55
240
R56
240
VLCD
VDD
VSS
TEST1
OSCIN
SCL
SDA
TEST2
SEG0
SEG1
SEG2
COM0
COM1
COM2
COM3
SEG25
SEG26
SEG27
SEG28
SEG13
SEG14
SEG15
SEG16
SEG17
SEG18
SEG19
SEG20
SEG21
SEG22
SEG23
SEG24
COM5
COM0
SEGH
SEGL


VDD3V3
J5
LOAD CELL
AINN
AINP
L31
742 792 041
L35 742 792 08
L29 742 792 041
L9 742 792 08
L33
742 792 041
L36
742 792 08
L32 742 792 041
L10 742 792 08
L39
742 792 08
R29
10K 1%
R32
10K 1%
C30
22nF
C23
22nF
C32
100pF
C33
22nF
C46
100pF
C22
22nF
C24
22nF
C35
100pF
C36
22nF
C49
100pF
C37
22nF
C26
100pF
C25
10uF
U5
CS5530
AIN+
AIN1-
C1
C2
VA+
VA-
AD
A1
OSC2
OSC1
AIN2+
AIN2-
VREF+
VREF-
DGND
VD+
CS
SDI
SDO
SCLK
X1
4.9152MHz
C40
0.1uF
C39
10uF
C19
C69
100P/0.1
C67
104
-ADC_CS0
SPI_SI
SPI_SO
SPI_SCK
VDD5V
L37
742 792 041
L34
742 792 08
L40 742 792 041
C38
0.1uF
C93
100pF
C94
22nF


3.7V BATTERY PH2.0
F1
NSMD110
Q1
CJ2301
Q2
CJ2301
VBAT
BT1
R26 51K 1%
C76 0.1uF
C2 CJ2302
D16 SMF 45A
R16 390K
R70 180K
R71 22K
R22 10K
POWER_ON
C72 0.1uF
C71 10uF
BAT_LVL1
R77 51K 1%
Q4 2SC1623
R75 56K
C60
PWR_CTL
D15 SD103
R74 10K
FC_SWCLK
D13 SS12
D17 1N4148
D18 BAT42
L48 221-1R5
R30 150K
R10
BT2
6V BATTERY PH2.0
Q3 CJ2302
BAT_LVL2
R31 51K 1%
R23
KEY_0
KEY_1
KEY_2
KEY_3
KEY_4
POWER_ON
JP1
FOR PROGRAMMING
SD103
D12
SW2 ON_OFF
SW3 CHANGE
SW4 PRINT
SW5 +0-
SW6 TARE
L4 742 792 08
L5 742 792 08
L6 742 792 08
L7 742 792 08
L8 742 792 08
L9 742 792 08
C101 C102 C103 C104 C105
+E
L2 10uH
D7 SS12
U6
MT3608 SOT-26
R51 100K 1%
R50 10K 1%
C16
C15
+5V
U7
XC6505 SOT-25
VIN VOUT GND CE NC
VDD5V
L47 221-1R5
C30 0.1uF
C31 1nF
C75 1uF
C77 2.2uF
C48 0.1uF
C47 1000pF
C78 10uF
C79
U11
LD1117S33 SOT-223
IN OUT GND
VDD3V3
L39 221-1R5
C76 10uF
C43 0.1uF
C44 1000pF
C45 100uF
C73 10uF
C74 0.1uF
C51 1000pF
C52 100uF
C80
VDD
C58 C95 C96 C97 C106 C107 0.1uF
C50 0.1uF
LED1 BACKLIGHT
LED2 BACKLIGHT
BACKLIGHT
Q6 NPN 2SC1623
Q5 NPN 2SC1623
R14 10K
R15 1.5M
R13 30 0805
F2
NSMD110
L3 221-1R5
D11 SS12
D10 SS12
C98 0.1uF
ZD1 6.2V
U8
TP4056
TEMP CE PROG CPRG GND STDBY VCC BAT
R27 2.2K
R28 100
R29 100
C12 10uF
C10 0.1uF
C11 10uF
BAT_CHAR
BAT_STDBY
CHR1
6V ADAPTOR
C97 22uF
L49 221-1R5
C81 0.1uF