

MAINTENANCE MANUAL

GS SERIES

MODELS: GS-1200 GS-1500 GS-3000
GS-6000 GS-12K GS-15K

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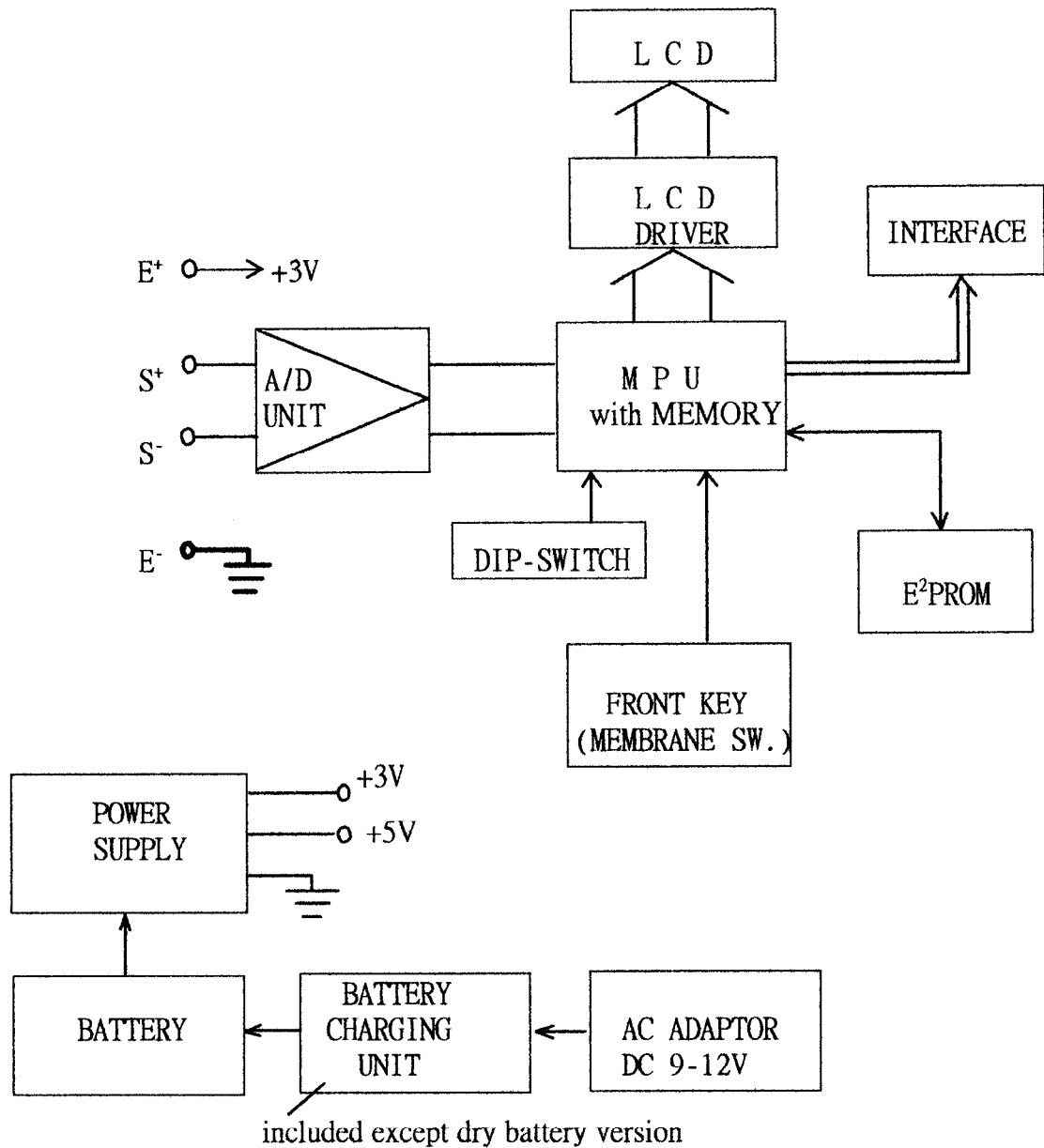
GS SERIES - ELECTRONIC WEIGHING SCALE

1. FEATURES:

- * Full Tare
- * Tare indicator
- * Zero indicator
- * Negative value indicator
- * Accumulation available(M+,MR,MC)
- * 2 types of Calibration
- * Dip switch to prevent end-user calibration
- * Sealable
- * Bubble level
- * Adjustable feet
- * Optional backlighting
- * D size dry battery or Built-in rechargeable battery operated
- * Low-battery signal
- * Auto power saving function
- * AC adaptor included
- * Overload protection for positive and negative force
- * Capacity: 1200g,3000g,6000g,12kg for 1/6000 resolution
1500g,3000g,6000g,15kg for 1/3000 resolution
- * All stainless steel housing

2. SPECIFICATION

1. SYSTEM BLOCK DIAGRAM



DESCRIPTION:

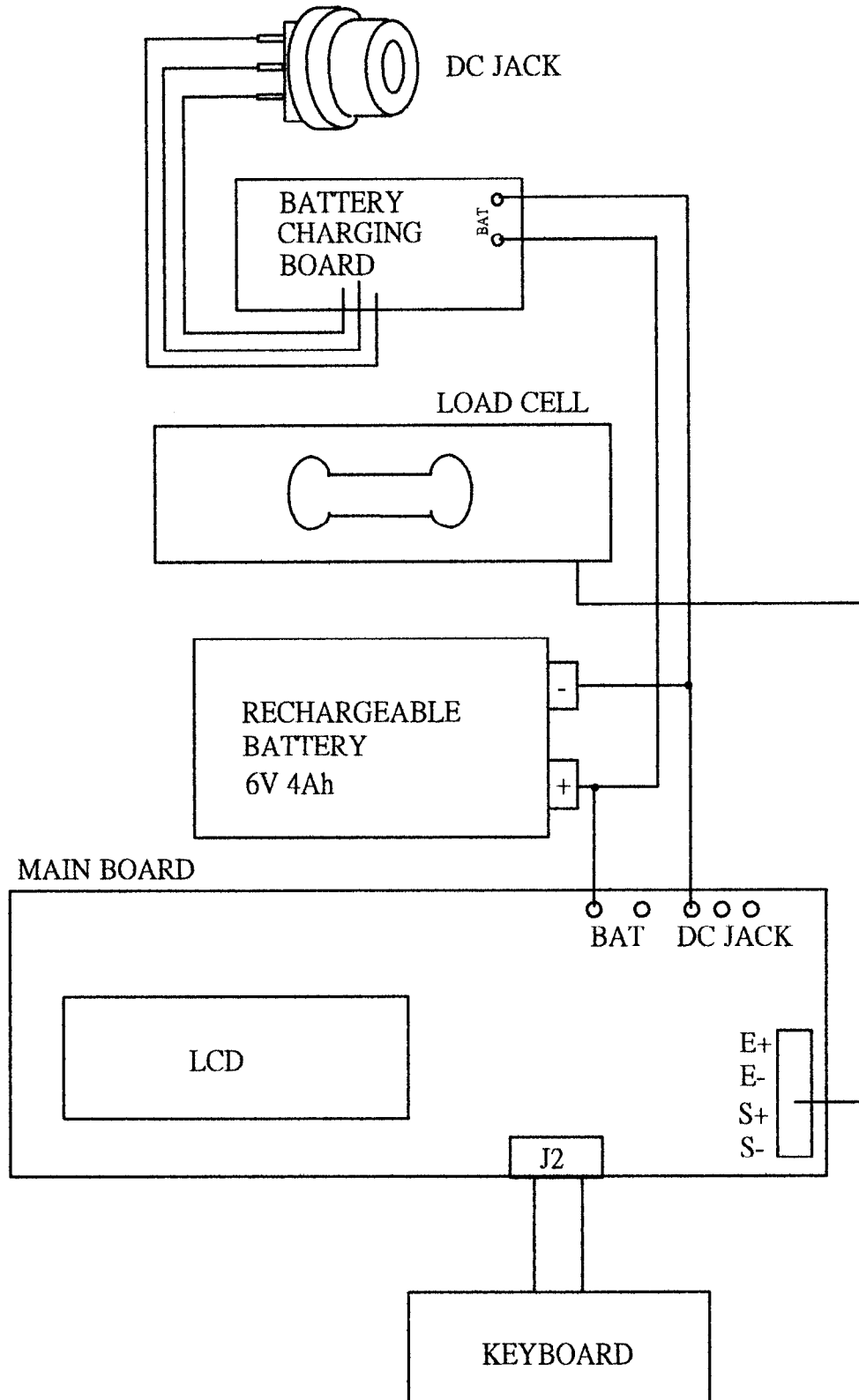
When a load is applied to the load cell. The resistance to the excitation current in the strain gauge changes and the analog output signal varies.

It is amplified and digitalized continuously by the A/D converter into a digital signal.

Subsequently, the resulting count is processed and managed by the CPU. The CPU refers to the instructions from the keyboard, and then conveys the output data to LCD driver which formats the data into a readout for the display.

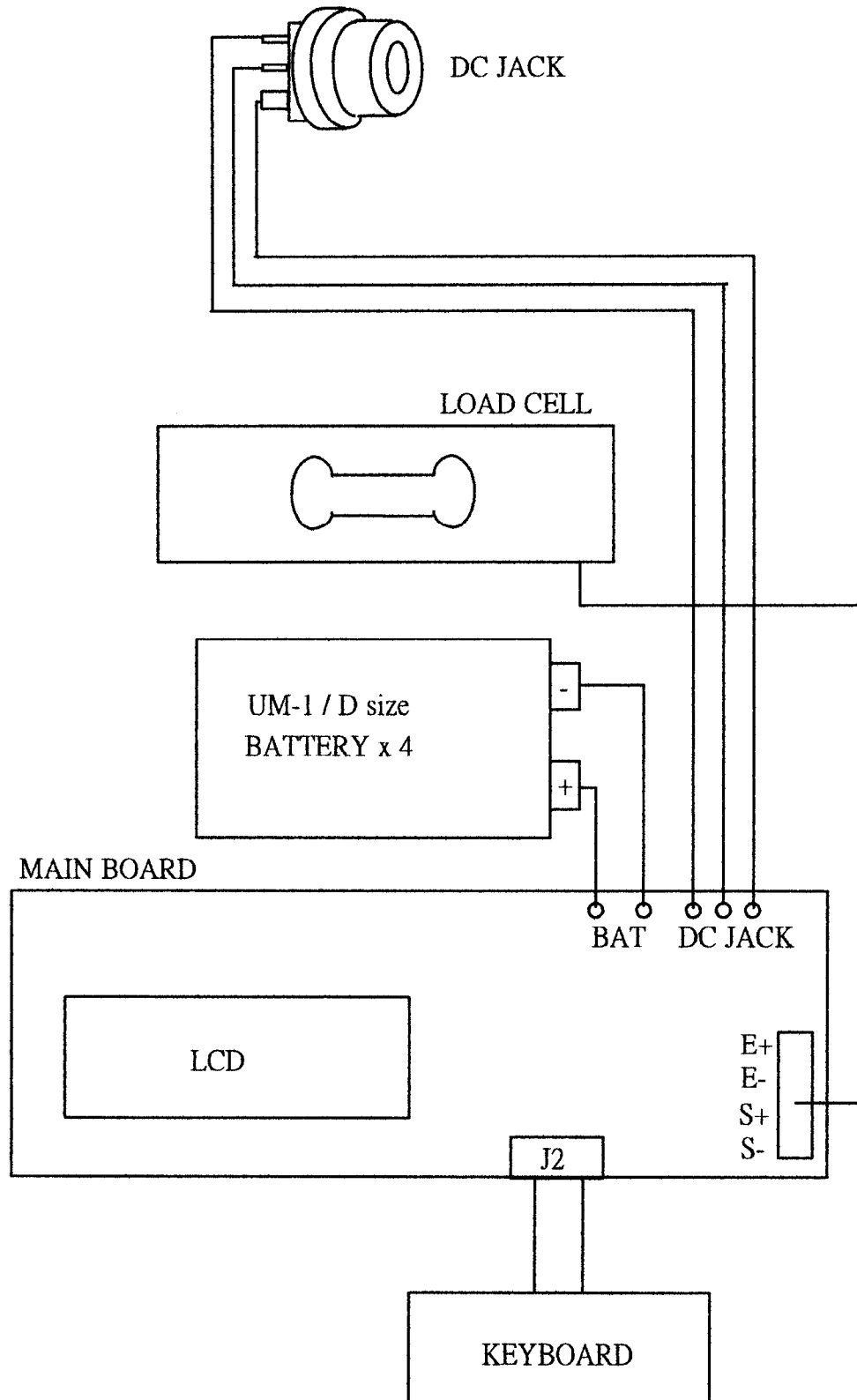
2. PHYSICAL LAYOUT OF ELECTRICAL CONNECTION

A. Rechargeable battery version



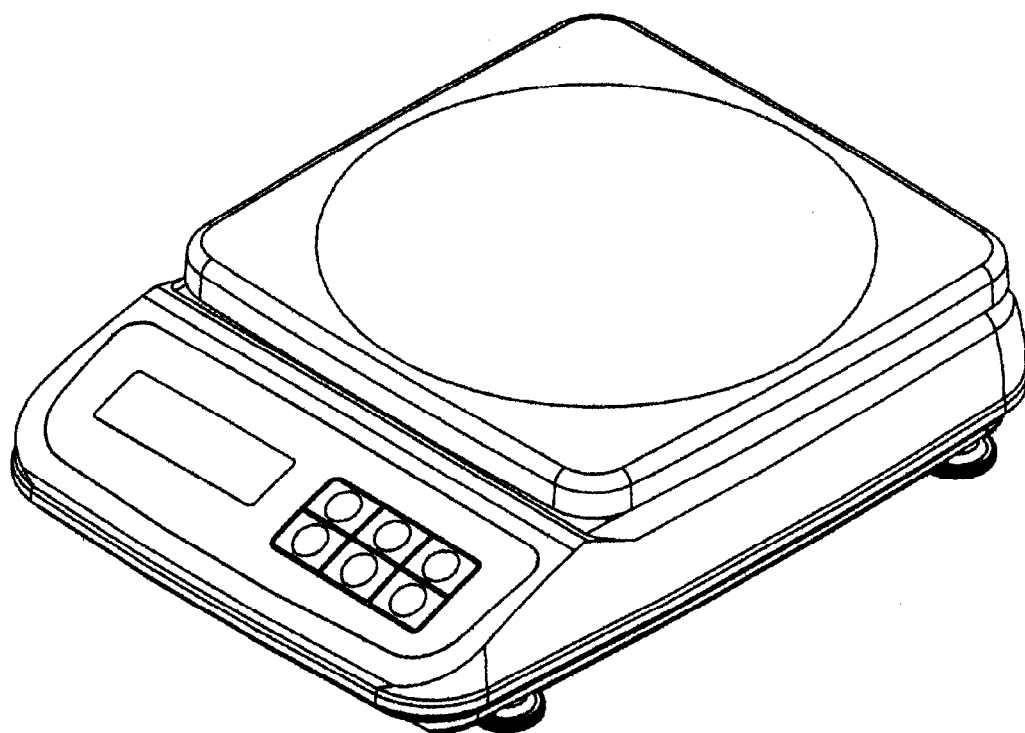
2. SPECIFICATION

2. PHYSICAL LAYOUT OF ELECTRICAL CONNECTION B. D size dry battery version



3. GENERAL SPECIFICATION

3.1 Overall View



2. SPECIFICATION

3. GENERAL SPECIFICATION

3.2 Dimension

- * Platter size: 210 x 210mm
- * Overall size: 310 x 230 x 74mm

3.3 Model specification

- Model name: GS-series
- Display resolution: 1/3000(1500g,3000g,6000g,15K)
1/6000(1200g,3000g,6000g,12K)
- Internal resolution: 1/30000
- Display: Single-sided
- Weight display--> 5 digits

3.4 Operation condition

- * Power source: 4 x D size dry battery or AC adaptor(DC 9-12V,100mA)
: Rechargeable battery(6V 4Ah) or AC adaptor (DC 9-12V,500mA)
- * Operating Temperature: 0 °C ~ 40 °C
- * Operating Humidity : 15 ~ 85% RH
- * Power Consumption : 0.1W
5W When charge

3.5 Main Components used

- * Micro Processor : 89C52
- * Crystal Oscillator : 6 MHz
- * Display device : Liquid Crystal Display(LCD)
- * Loadcell : 350 resistance loadcell

3.6 Analog Specification

- * INPUT SENSITIVITY : 2mV/V
- * ZERO ADJUST RANGE : 2% R.O.
- * ZERO BALANCE RANGE : +/-5% R.O.
- * L/C APPLIED VOLTAGE : DC 3V
- * SPEED OF A/D CONVERSION : 20 times/sec
- * INTERNAL RESOLUTION : 30000

3.7 Model VS. Capacity & division

MODEL NO.	CAPACITY	EXTERNAL DIVISION	
		1/3000	1/6000
GS-1200	1200g		0.2g
GS-1500	1500g	0.5g	
GS-3000	3000g	1g	0.5g
GS-6000	6000g	2g	1g
GS-12K	12kg		2g
GS-15K	15kg	5g	

1. INTERNAL FUNCTIONS AND ALTERNATE DIVISION

INTERNAL FUNCTION TABLE

Function	Symbol	Description
1	F.1	Span value reading and dealer calibration
2	F.2	Full display segment and max. capacity check
3	F.3	Check offset value and scale configuration
4	F.4	Auto power off setting

HOW TO ENTER THE REQUIRED FUNCTION MODE

- Turn scale off.
- Press and hold TARE, then turn scale on. Scale display F.1
- Press TARE until the required function number appears.
- Press MODE
- Press MODE until the required setting appears.
- Press TARE to confirm.
- Repeat step c to f for other function setting, or
- Press ZERO to save settings and return to normal operation.

F.1 Span Value Reading and Dealer Calibration

Simply enter F.1, then put on the designated mass to check Span Value or keep going to do the Dealer Calibration.

F.2 Display Segment and Rated Capacity & Division Check

When function is entered, scales will first display the rated capacity and division, then display all segment. Check and make sure that no segment are missed.

F.3 Check Offset Value is within acceptable range and Scale Configuration

- Enter F.3, scale displays the Offset Value.
- Hold MODE(for about 2 seconds)
- Scale displays capacity and division configuration.
- Press MODE until the required configuration obtained.
Note: In some countries, only the metric weight unit is available.
- Press ZERO to save setting and back to normal operation status.

F.4 Auto Power Off Setting

Two modes are available: (Default=4_OFF)

0._OFF = Auto Power Off function is disabled.

4._OFF = Scale will automatically turned off after 4 minutes not used.

3. INITIAL SETUP

2. AUTO AND DEALER CALIBRATION

ACCEPTABLE LOAD FOR AUTO AND DEALER CALIBRATION

Model Number	External Division	Acceptable Auto and Dealer Calibration Load	
GS-1500	1/3000	500g	1kg
GS-3000	1/3000	1kg	2kg
GS-6000	1/3000	2kg	5kg
GS-15K	1/3000	5kg	10kg
GS-1200	1/6000	500g	1kg
GS-3000	1/6000	1kg	2kg
GS-6000	1/6000	2kg	5kg
GS-12K	1/6000	5kg	10kg

Dealer Calibration Procedure:

- 1 Turn scale off.
- 2 Press and hold TARE, then turn scale on.
- 3 Scale displays F.1
- 4 Press MODE
- 5 Scale displays offset value
- 6 Press ZERO to zero offset value
- 7 Press TARE, scale displays S=1
- 8 Press ZERO, scale displays S=2
- 9 Press TARE, scale displays S=1
- 10 Press ZERO, scale displays an arrow at the right hand of the display. It means the scale is ready for dealer calibration.
- 11 Make sure that the figure being displayed is =0 or 1, if not, press ZERO again.
- 12 Load calibration either load as listed on above table.
- 13 When value displayed is stable, press MODE.
- 14 Wait until the scale start count down.
- 15 Calibration completed and scale is ready for operation.

Auto Calibration Procedure:

- 1 Turn scale off
- 2 Press and hold MODE, then turn scale on.
- 3 Scale displays CAL?
- 4 Press MODE
- 5 Scale displays LOAD XXXX or XXXX
- 6 Load calibration load according to above table.
- 7 Wait until the scale display DONE and start count down.
- 8 Calibration completed and scale is ready for operation.

3. DISABLE CALIBRATION WITH DIP SW.(S1)

The DIP SW.#1 is used to control calibration. Push this switch to ON position to disable calibration.

4. OFFSET AND SPAN VALUE DATA

OFFSET AND SPAN VALUE DATA TABLE

Model Number	External Division	Offset Value (Thousand)	Span Value(Thousand) at Various Load Applied	Offset Control	Span Control(Ohm)	
					R1A	R1B
GS-1500	1/3000	10~14	11~15 at 500g 22~30 at 1kg	VR1 Trimmer	40K	X
GS-3000	1/3000	10~14	11~15 at 1kg 22~30 at 2kg	VR1 Trimmer	40K	X
GS-6000	1/3000	10~14	11~15 at 2kg 26~36 at 5kg	VR1 Trimmer	30K	X
GS-15K	1/3000	10~14	11~15 at 5kg 22~30 at 10kg	VR1 Trimmer	25K	X
GS-1200	1/6000	10~14	13~18 at 500g 26~36 at 1kg	VR1 Trimmer	40K	X
GS-3000	1/6000	10~14	11~15 at 1kg 22~30 at 2kg	VR1 Trimmer	40K	X
GS-6000	1/6000	10~14	11~15 at 2kg 26~36 at 5kg	VR1 Trimmer	30K	X
GS-12K	1/6000	10~14	13~18 at 5kg 26~36 at 10kg	VR1 Trimmer	25K	X

READING OFFSET VALUE

- 1 Turn scale off
- 2 Remove all load from platter
- 3 Enter F.3 and read the offset value

READING SPAN VALUE

- 1 Turn scale off
- 2 Remove all load from platter
- 3 Enter F.1
- 4 Press ZERO
- 5 Apply load to platter. Span value according to load applied will be displayed.

HOW TO ADJUST OFFSET VALUE

In case the offset value is out of range, adjust the trimmer located at VR1 on the mainboard to obtain correct offset value.

HOW TO ADJUST SPAN VALUE

The span value is controlled by resistor located on R1A, standard resistor value of R1A is listed on the above table. If the required span value is not attained, then change R1A resistor according to either case below:

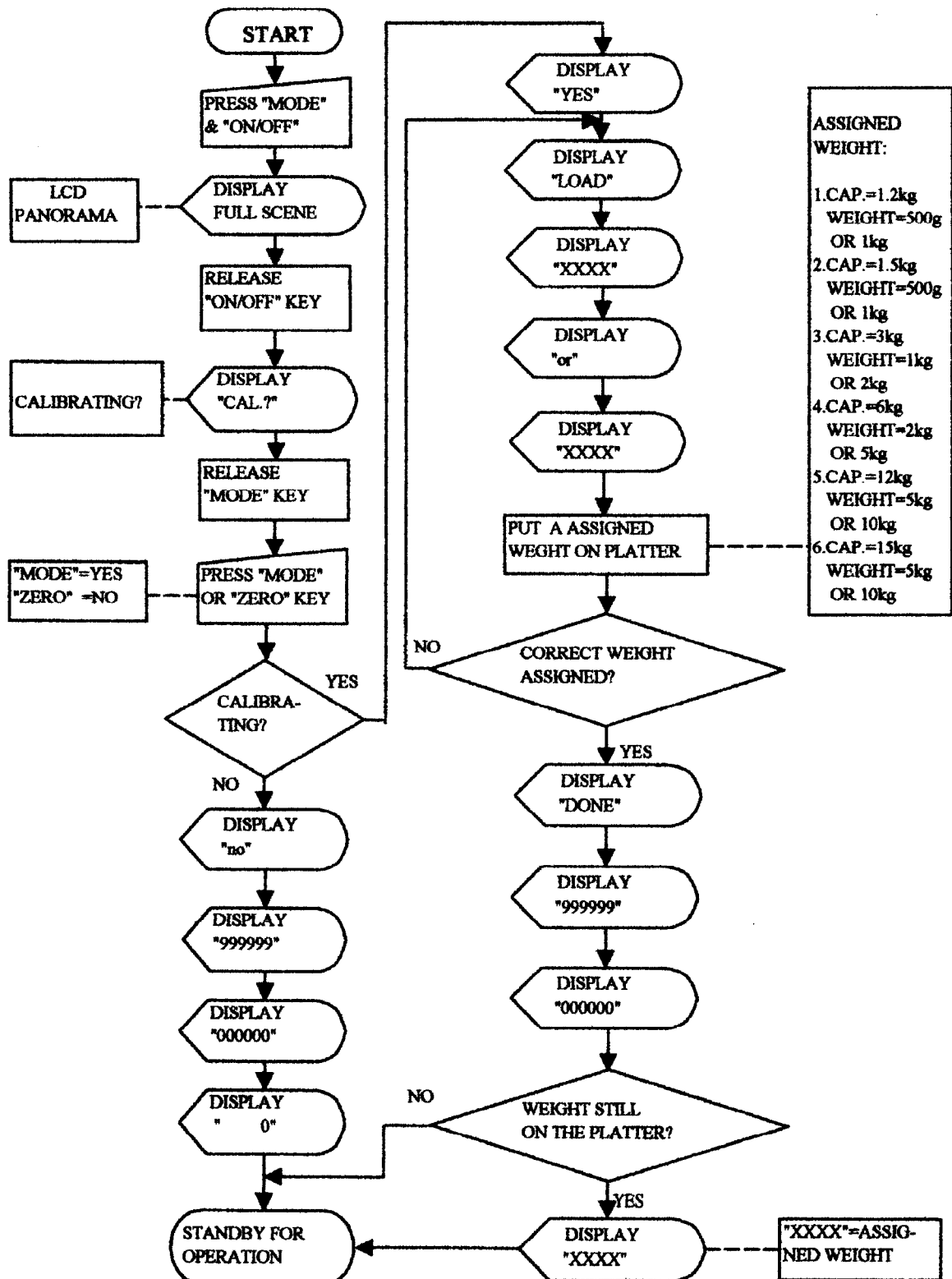
Span value too low : Increase the resistance of R1A.

Span value too high : Decrease the resistance of R1A.

3. INITIAL SETUP

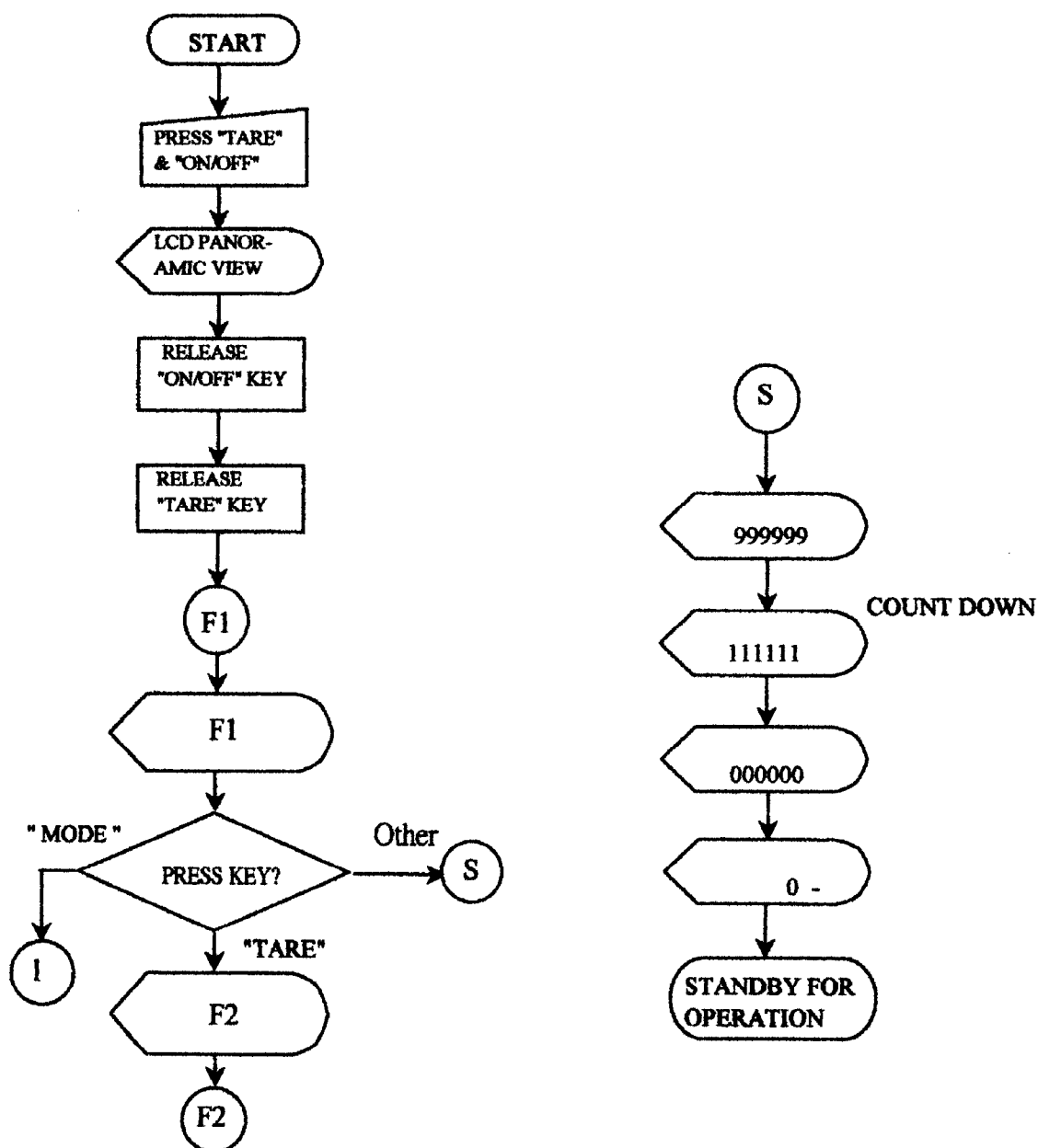
5. FLOW CHART

5.1 Auto Calibration(for end-user)

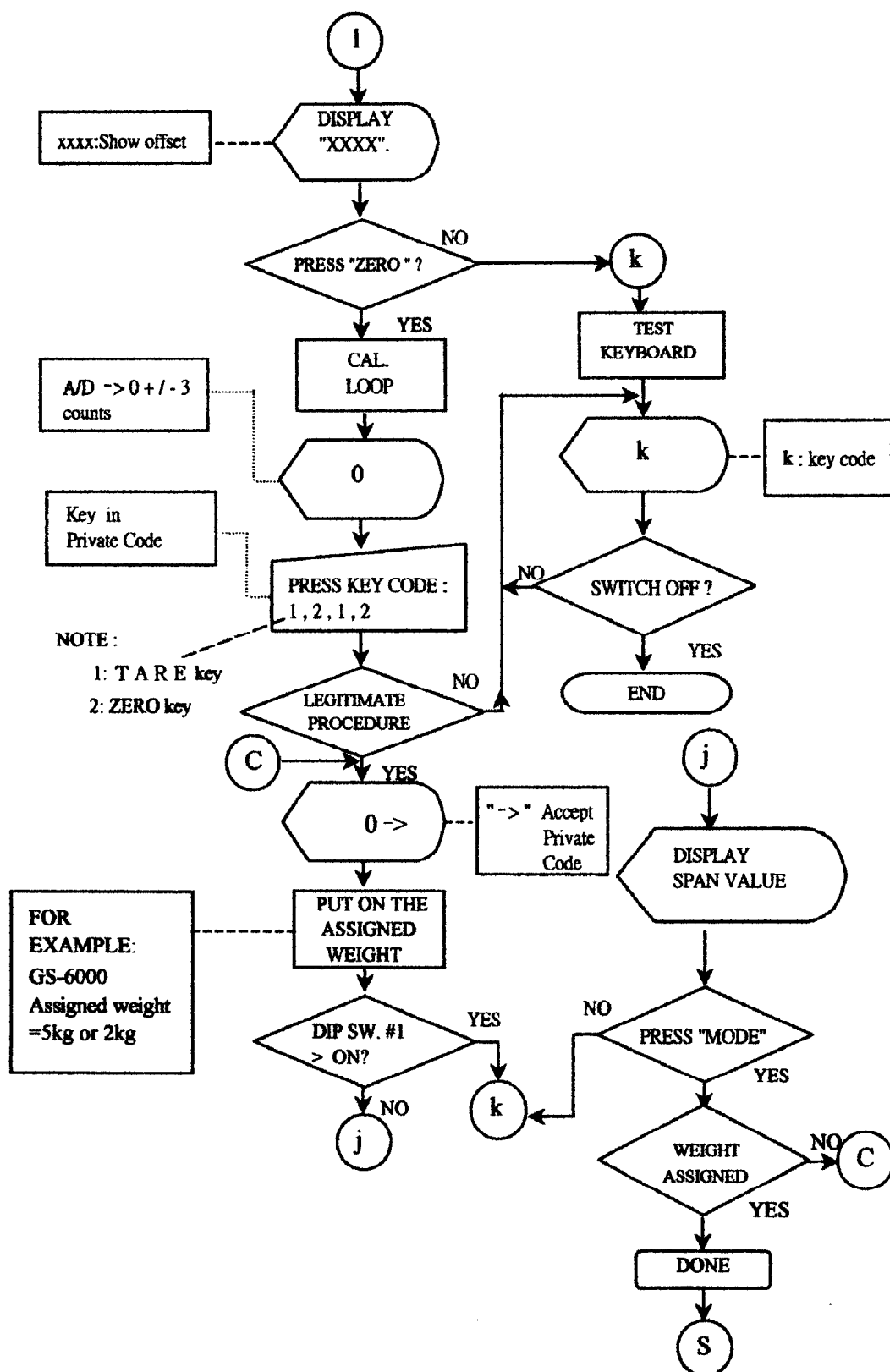


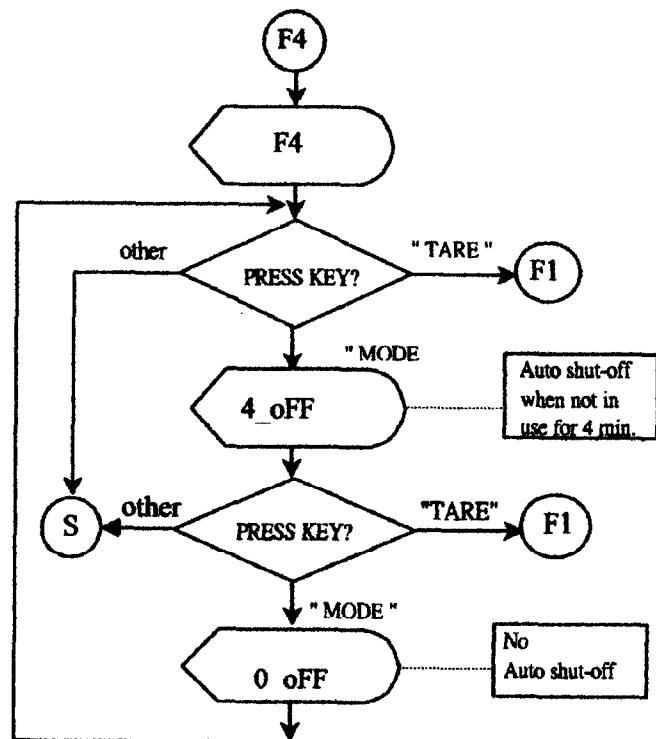
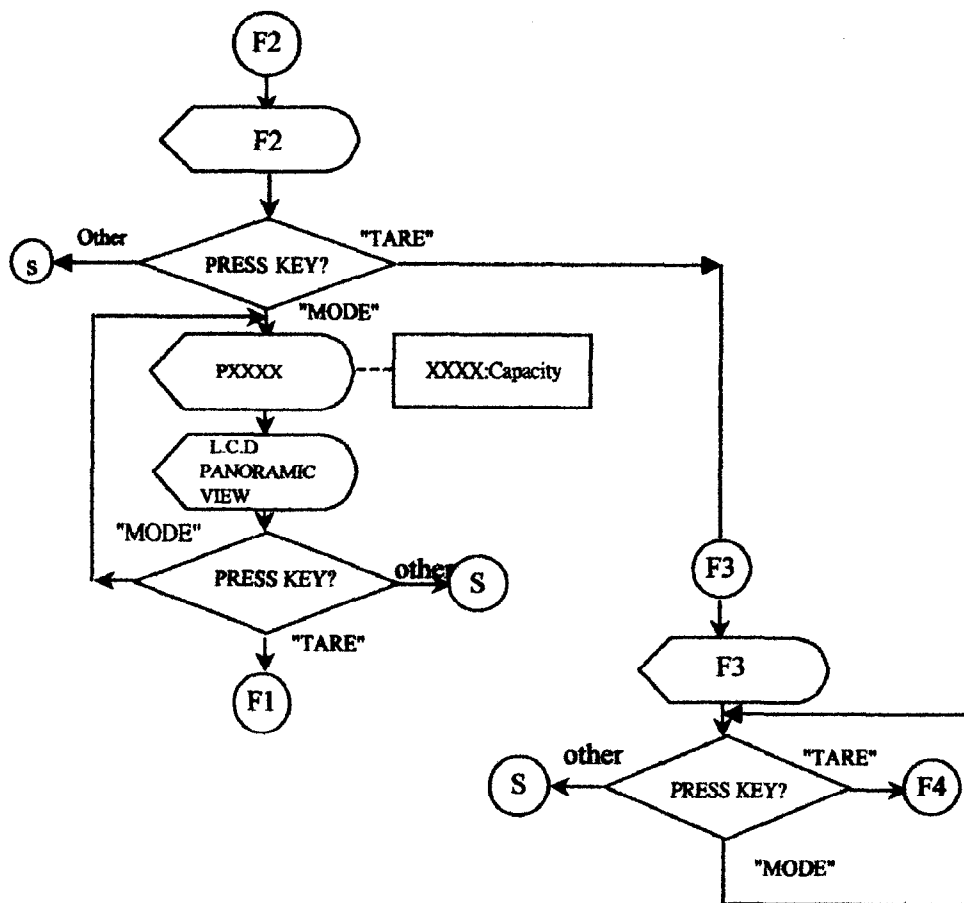
5. FLOW CHART

5.2 Function Test(for technicians only)



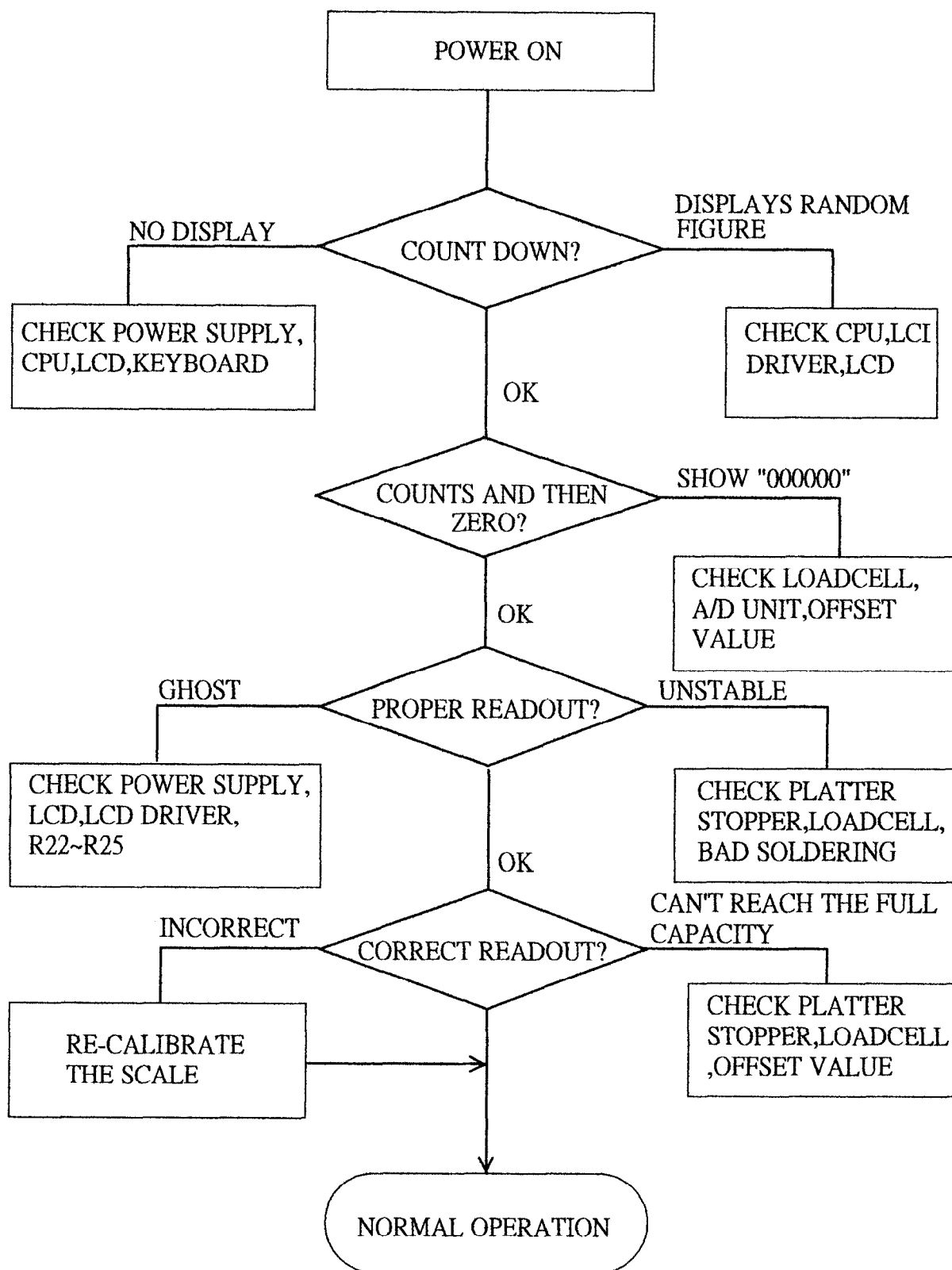
3. INITIAL SETUP





4. TROUBLE SHOOTING

1. TROUBLE SHOOTING LOOP



2. PARTS AND COMPONENTS TROUBLE SHOOTING

2.1 Power Supply Checking

2.1.1 Relevant parts:

2.1.1.1 Rechargeable battery version

Power Board(HGS-20-1)

Q1(C1061)

ZD1(8.2V)

R3(1.2 ohm,1/2W)

Q2(C945)

DC-JACK(SCD-21)

Main Board(GS-10-2)

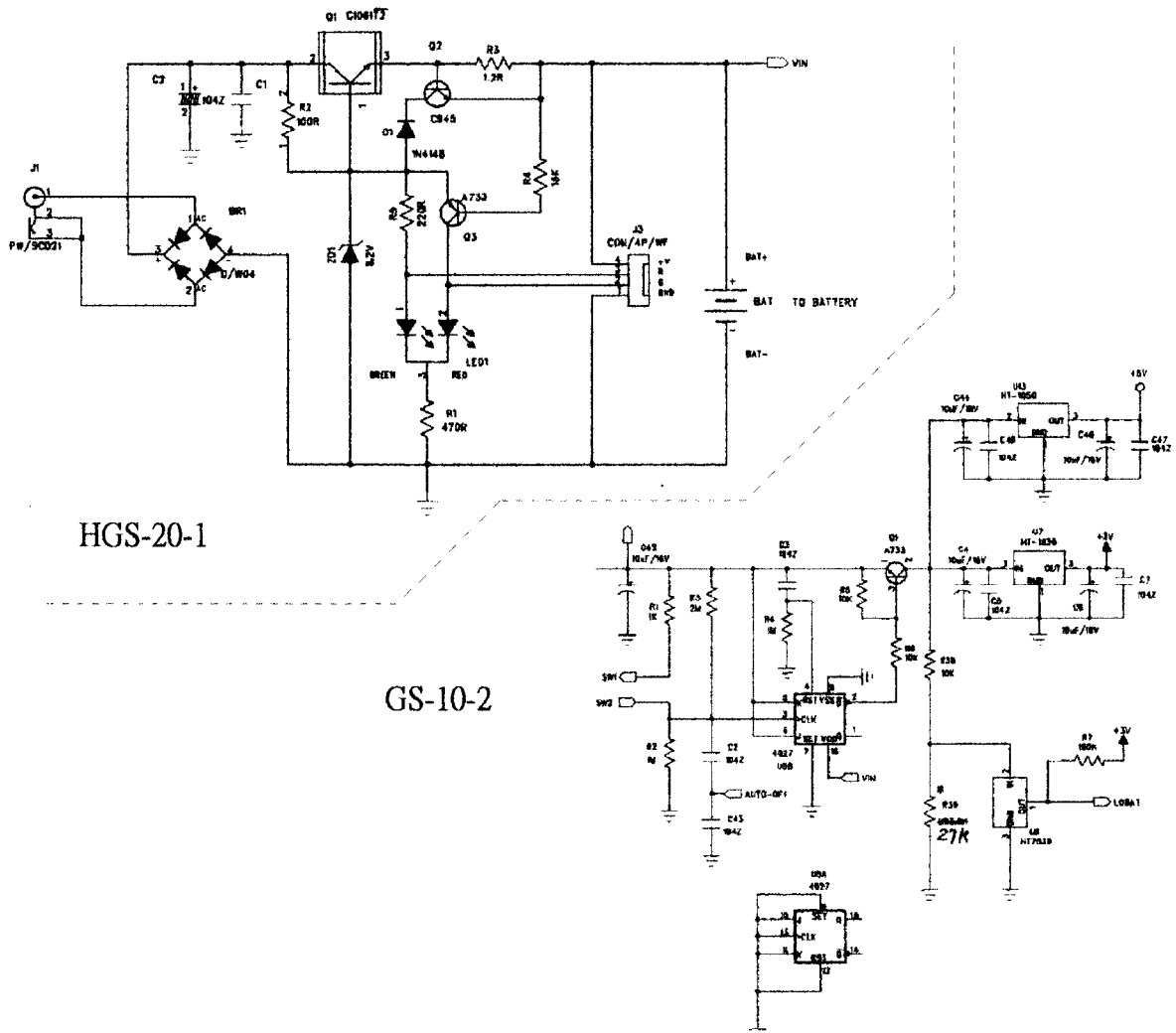
U5(IC 4027)

Q1(A733)

U7(HT-1030)

U13(HT-1050)

U8(HT-7039)



4. TROUBLE SHOOTING

Description:

- 1) AC Adaptor: This AC adaptor provides about 9-12V dc power.
- 2) Battery: Built-in Rechargeable Battery 6V 4Ah.
- 3) How Battery is charged completely?
The charging voltage is regulated by Q1(C1061) and ZD1(8.2V) for about 7 volts.
The charging current will go down automatically If battery full charged when voltage reached.
Q2(C945) and R3(1.2R,1/2W) provide Over-Current protection.
- 4) +3V power drives both digital & analog circuits system.
U7(HT-1030) is a 3volts Voltage Regulator.
- 5) +5V power is to drive the Printer(Centronic) interface
U13(HT-1050) is a 5volts Voltage Regulator.
- 6) Auto-off:
If the scale is set on 4_off or even under LO-BAT situation, after some minutes the CPU will release a positive pulse to toggle the U5 output(pin#2) going high, then Q1 will be cut-off, therefore the scale is shut down immediately.
- 7) Low Power Detection:
The U8(HT-7039) is designed to detect the power level.
Whenever the power less than 3.9V, it will release a low potential signal to CPU, and then CPU will instruct LCD display to show LO-BAT symbol.

2.1.1.2 D size dry battery version

Main Board(GS-10-2)

C1(470uF/16V)

D2(1N4148)

U12(78L08)

U5(IC 4027)

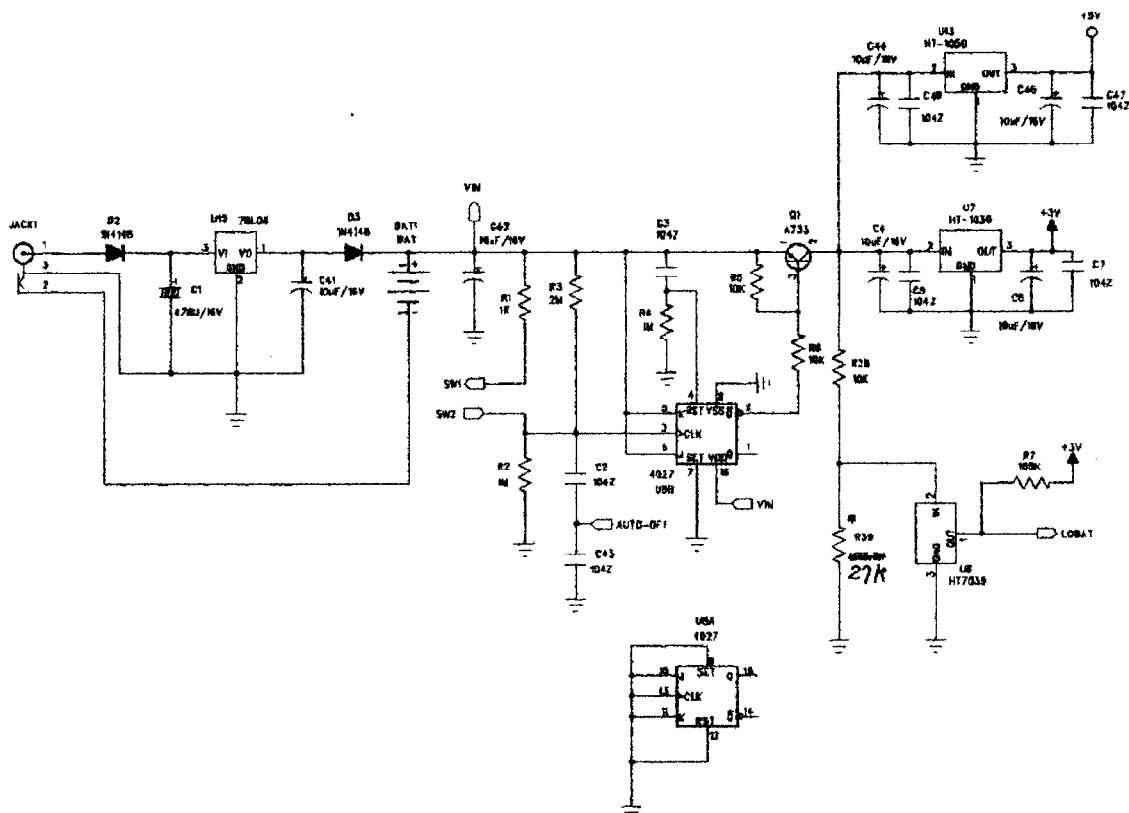
Q1 (A733)

U7(HT-1030)

U13(HT-1050)

U8(HT-7039)

DC-JACK (SCD-21)



2.1.2 Input voltage: 5.5V or higher

Check and replace battery if voltage less than 5.5V.

Check DC-JACK or AC adaptor if been defective.

2.1.3 Output voltage: 3V +/- 10%

Check that the output voltage is within 3V +/- 10%

a) less than 2.7V, the CPU may not work properly.

b) more than 6V, ghost will appear on LCD.

4. TROUBLE SHOOTING

2.2 Platter Stopper Checking

The platter device shall not touch anything around itself during operation. Check that the platter is not contacted with the upper(no load) and/or lower (with load) stopper.

2.3 LCD Display Checking

2.3.1 Check that it is soldered and connected properly between LCD and driver IC(uPD7225), driver IC(uPD7225) and CPU.

2.3.2 Check whether LCD is broken.

2.4 CPU Checking

2.4.1 Check that all pins are seated properly into the socket.

2.4.2 Check that the Crystal Oscillator works.

2.4.3 Check the RESET is normally low.

2.5 A/D Unit Checking

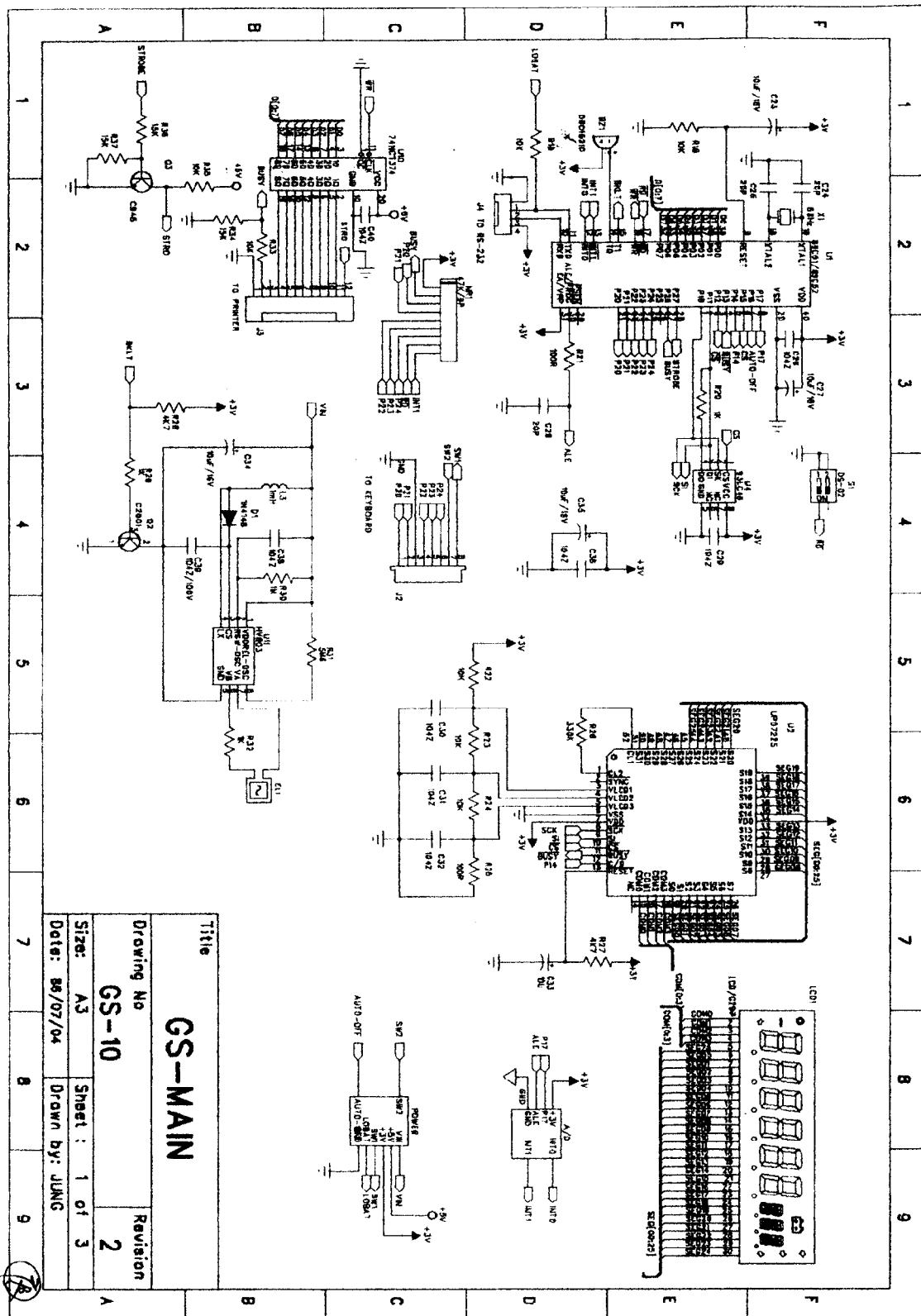
2.5.1 Check that the +3V power is correctly fed to the A/D unit.

2.5.2 Check that the signal output of loadcell is normal.

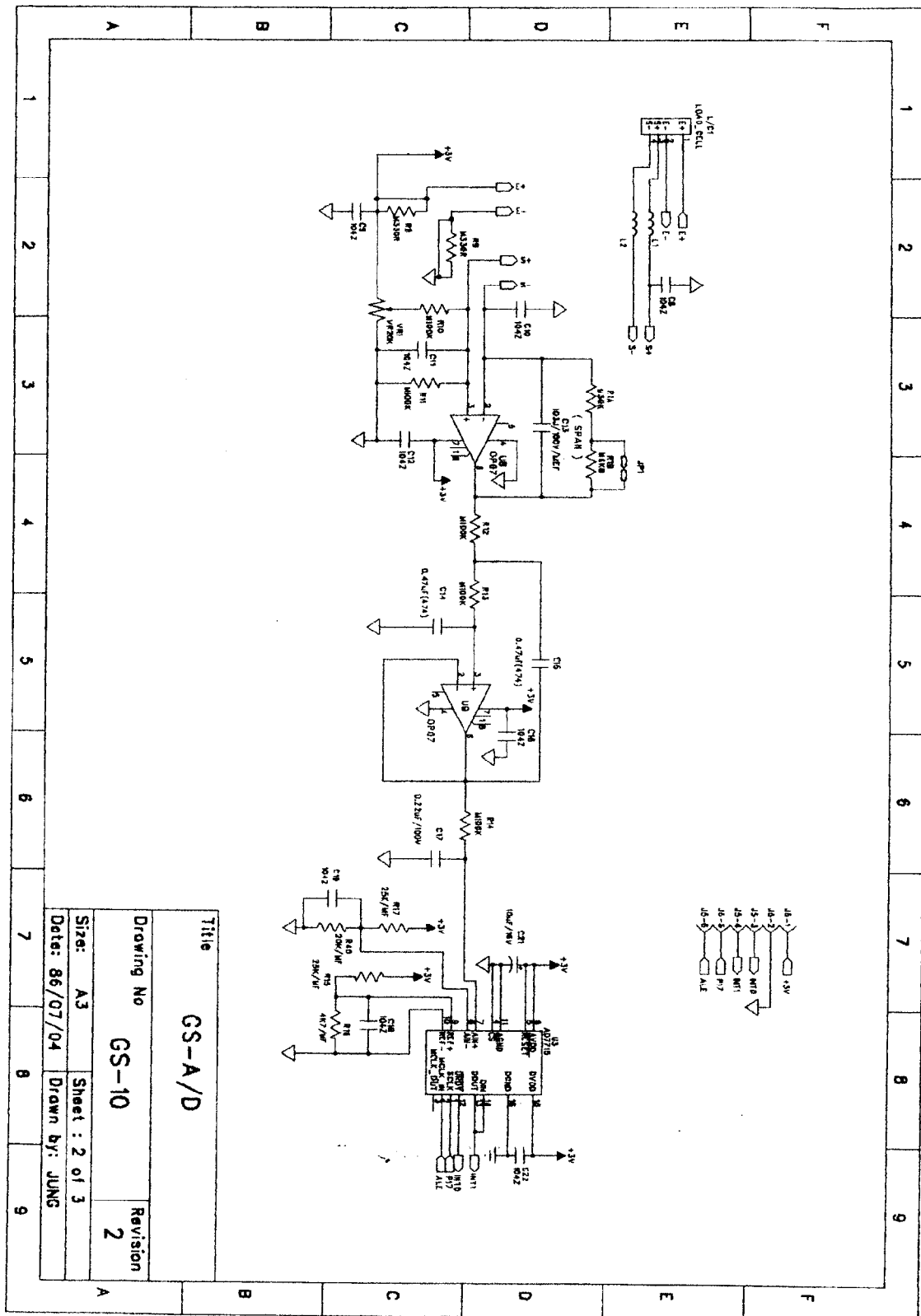
2.5.3 Check OP. Amplifier & A/D Converter(AD7715).

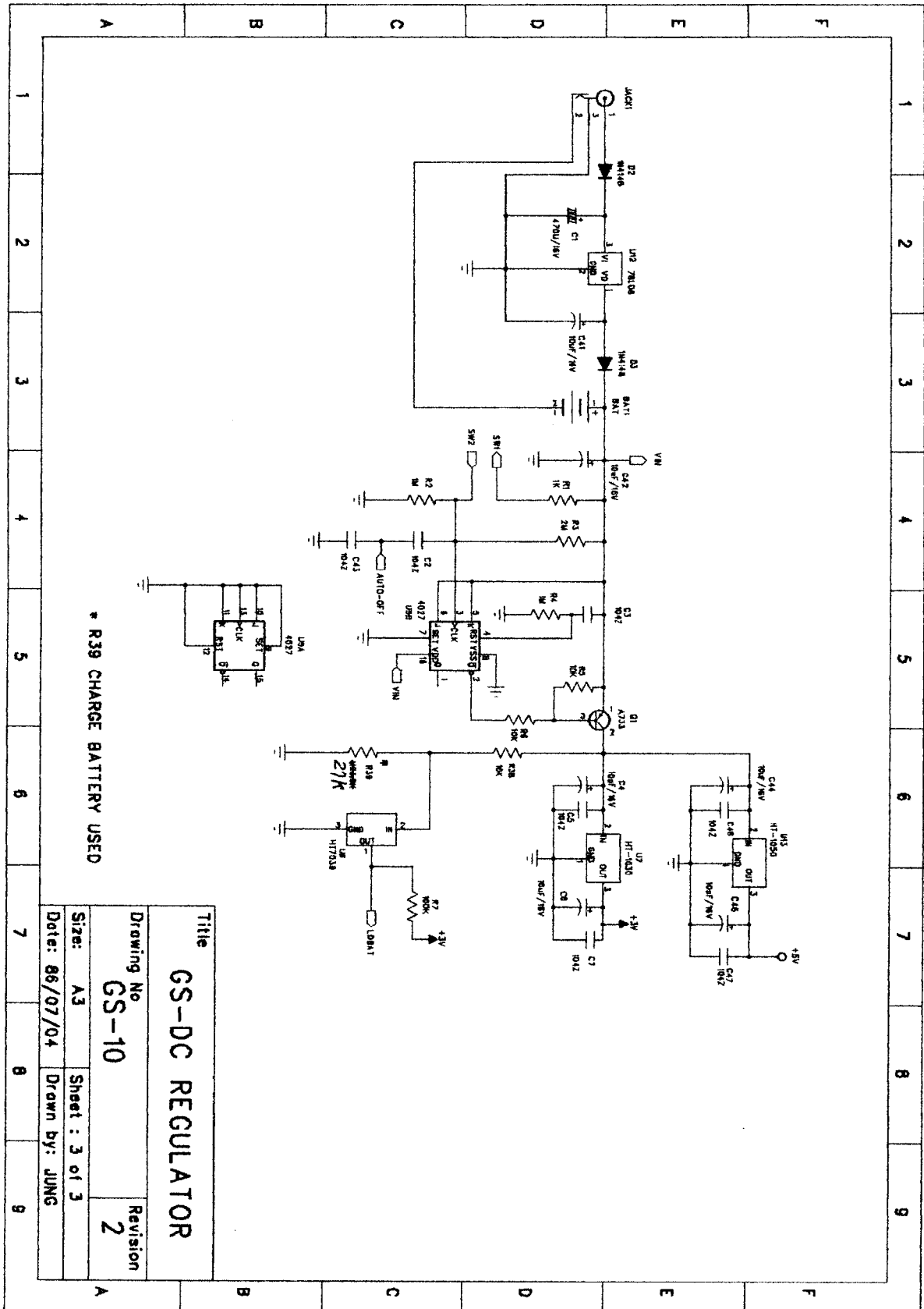
When no error is found with the above checking procedures, the trouble can be caused on the loadcell or the PCB itself. Replace a new one could be better to identify the defective. In this way, the readout of weight would be varied because of the output voltage of loadcell and defferent span value, so recalibration is required after this replacement.

1. SCHEMATICS

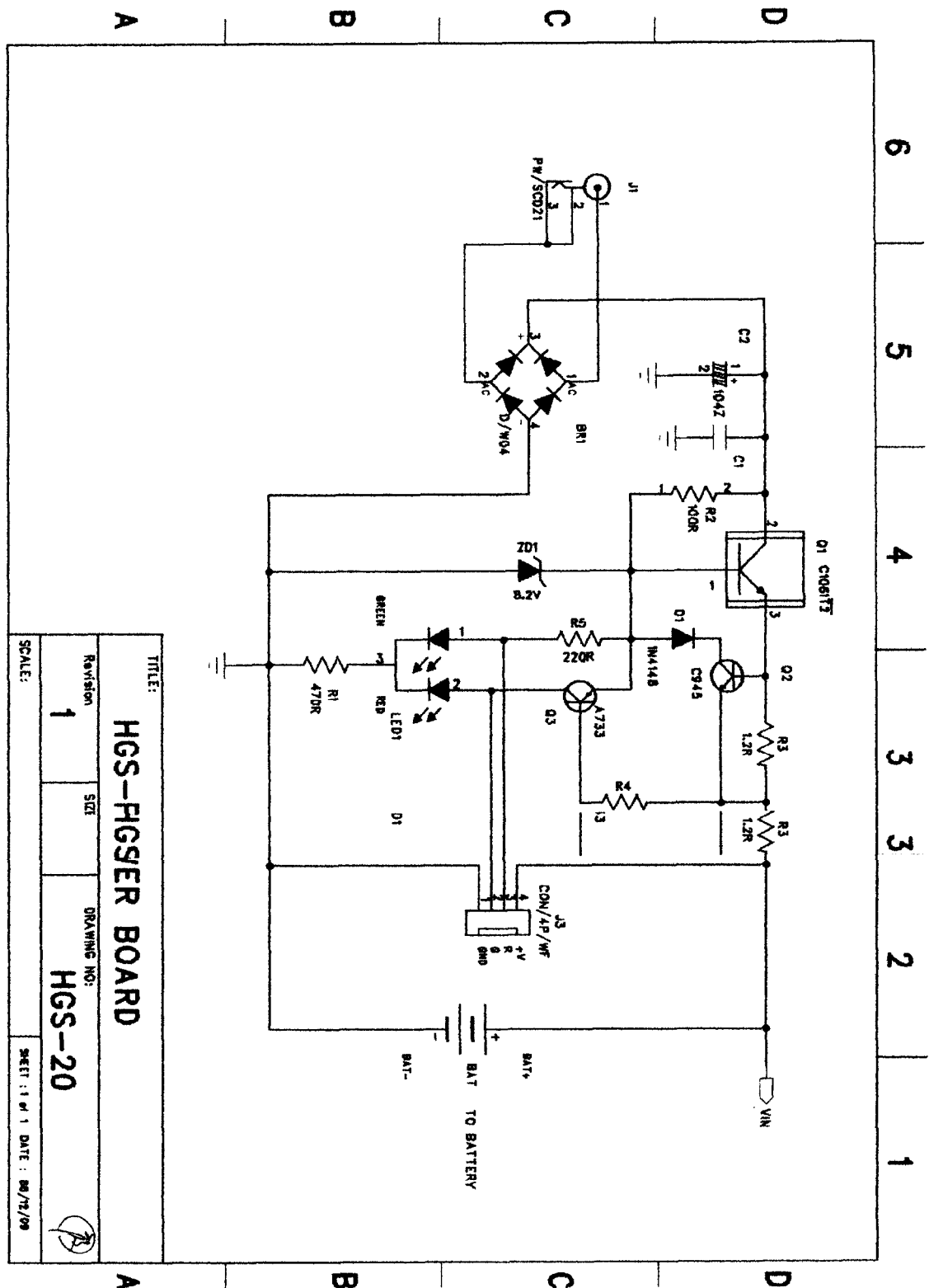


5. ELECTRICAL CIRCUITRY

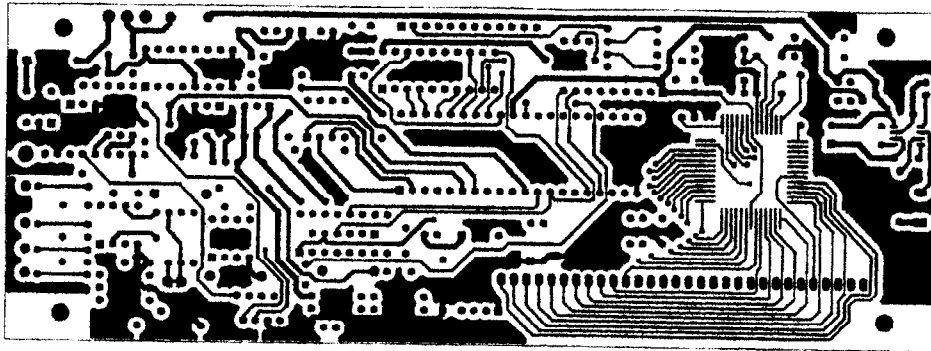




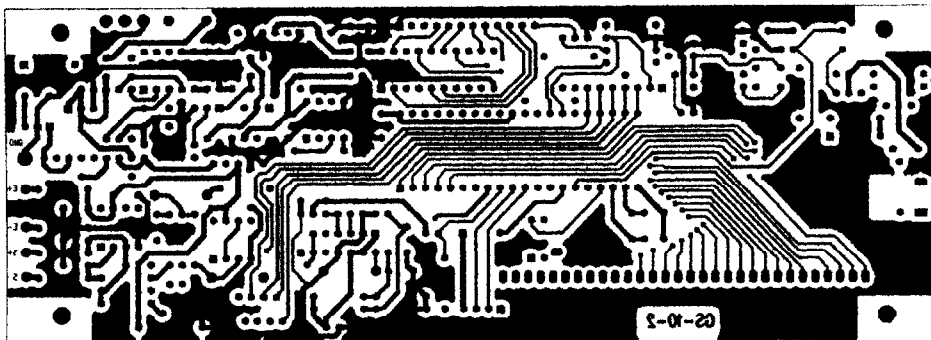
5. ELECTRICAL CIRCUITRY



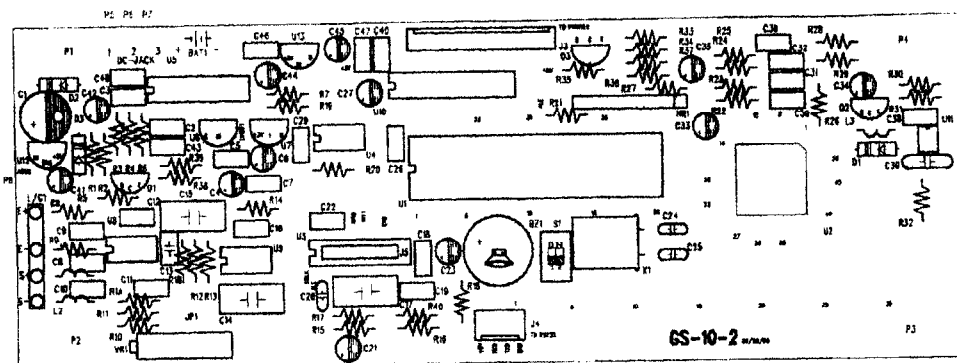
2. PCB LAYOUT



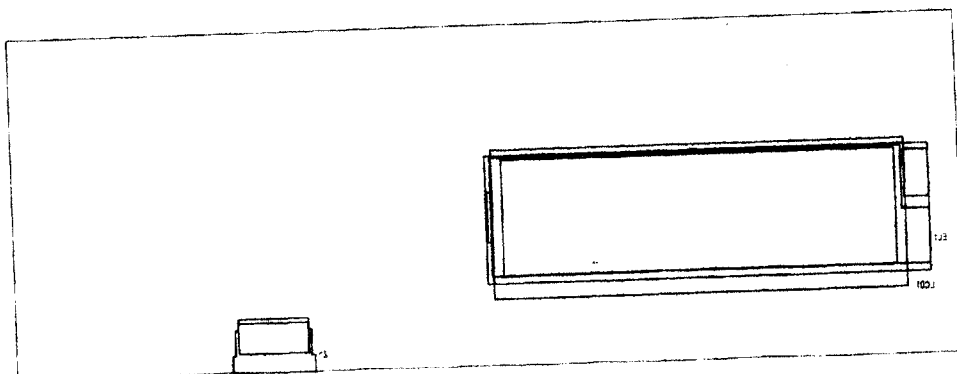
GS-10-2
TOP LAYER



GS-10-2
BOTTOM LAYER

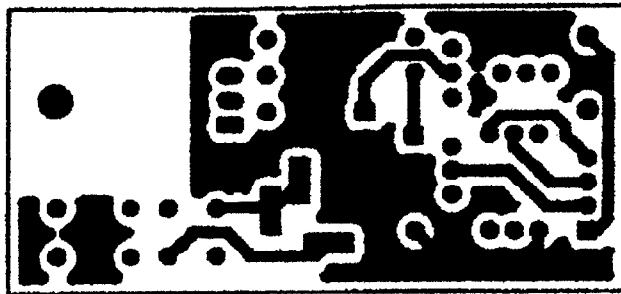


GS-10-2
TOP OVERLAY

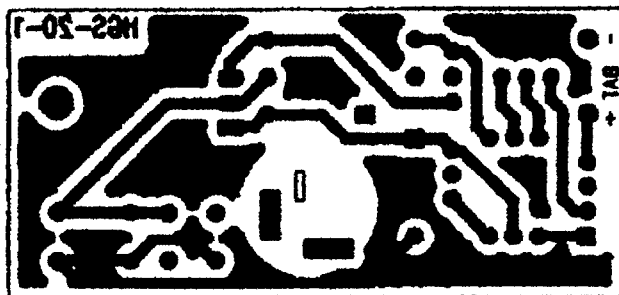


GS-10-2
BOTTOM OVERLAY

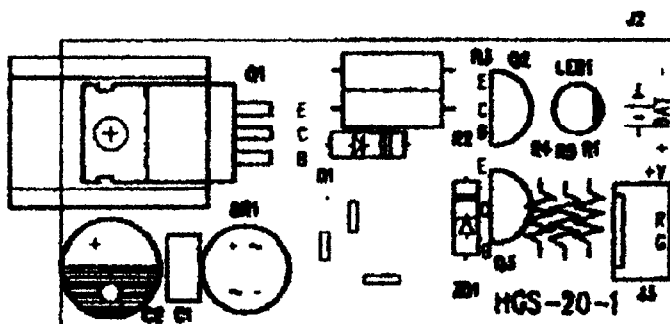
5. ELECTRICAL CIRCUITRY



**HGS-20-1
TOP LAYER**



**HGS-20-1
BOTTOM LAYER**



**HGS-20-1
TOP OVERLAY**

GS SERIES PARTS LIST

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
F0005GS0010	S/S HOUSING: UPPER	GS SERIES	1	
F0005GS0000	S/S HOUSING: LOWER	GS SERIES	1	
F0003GSP101	L/C ALUMINUM LOWER SUPPORT	G SERIES	1	
F0003GSP100	L/C ALUMINUM UPPER SUPPORT	G SERIES	1	
A00*****	LOADCELL	C2X1 OR EQUIVALENT	1	AS PER MODEL
F0022000000	ADJUSTABLE FEET	GS SERIES,S/S	4	
G0030GS0000	SEALING RUBBER	GS SERIES	1	
B0GS0000000	KEYBOARD	GS SERIES,6 KEYS	1	
COGS0000***	PC FASCIA	GS SERIES	1	AS PER MODEL
F0002GS0000	S/S PLATTER	GS SERIES	1	
A1600060400	RECHARGEABLE BATTERY	6V 4Ah	1	
A60*****	ADAPTOR	***V/9V,500mA	1	
A0906000210	D.C. JACK	SCD-21	1	
Z6GS1000000	PACKAGE	GS SERIES	1	
E9GS0000000	P.C.B. KIT	GS-10-X	1	
E9HGS010000	P.C.B. KIT	HGS-20-X	1	
A1204010370	CONDUCTIVE WIRE	37cm(BLACK)	1	
A1204010372	CONDUCTIVE WIRE	37cm(RED)	1	
A1205010300	CONDUCTIVE WIRE	30cm(BLACK)	1	
A1205010302	CONDUCTIVE WIRE	30cm(RED)	1	

MAINBOARD

E0GS0000000	P.C.B.	GS-10-X	1	
A0205040270	I.C.	4027	1	U5
A0202093462	I.C.	93LC46	1	U4
A0207078081	I.C.	78L08	1	U12
A0203077150	I.C.	AD7715-3	1	U3
A0250070390	I.C.	HT7039	1	U6
A0250008030	I.C.	HV803	1	U11
A0206000071	I.C.	OP-07CP	2	U8,U9
A0208072250	I.C.	uPD7225	1	U2
A0207010301	VOLTAGE REGULATOR	HT1030	1	U7
A0207010501	VOLTAGE REGULATOR	HT1050	1	U13(OPTION)
A0204743742	I.C.	74HC374	1	U10(OPTION)
A0300000040	I.C. SOCKET	40 PIN	1	U1
A0401009450	TRANSISTOR	2SC945	1	Q3
A0401020010	TRANSISTOR	C2001	1	Q2
A0401007330	TRANSISTOR	A733	1	Q1
A0501004148	DIODE	1N4148	3	D1,D2,D3
A0701477016	CAPACITOR (EC)	470uF/16V	1	C1
A0701106017	CAPACITOR (EC)	10uF/16V(SS TYPE)	12	C4,6,21,23,27,33-35,41,42,44,45

6. PARTS LIST

A0730104050	CAPACITOR (MLC)	104Z	26	C2,3,5,7-12, 16,18~20,22, 26,29~32,36, 38,40,43, 46~48
A0710224101	POLYESTER FILM CAPACITOR(MEF)	0.22uF/100V(224)	1	C17
A0713474063	POLYESTER FILM CAPACITOR(MEF)	0.47uF(474)	2	C14,15
A0720103101	POLYESTER FILM CAPACITOR(PET)	0.01uF/100V(103J)	1	C13
A0740104100	CERAMIC CAPACITOR (CC)	0.1uF/100V	1	C39
A0740020050	CERAMIC CAPACITOR (CC)	20PF	3	C24,25,28
A1002108000	INDUCTOR	1mH	1	L3
A1005030512	FERRITE BEAD	3.5 x 6 x 0.8 mm	2	L1,L2
A0804041003	METAL FILM RESISTOR	100K ohm,1/4W	5	R10~14
A0804042702	METAL FILM RESISTOR	27K ohm,1/4W	1	R39
A0804042502	METAL FILM RESISTOR	25K ohm,1/4W	2	R15,17
A0804042002	METAL FILM RESISTOR	20K ohm,1/4W	1	R40
A0804044701	METAL FILM RESISTOR	4.7K ohm,1/4W	1	R16
A0802047309	RESISTOR NETWORK	47K ohm,9 PIN	1	NR1
A0805041103	CARBON FILM RESISTOR	10K ohm,1/4W	10	R5,6,18,19, 22~24,33,35, 38
A0805041101	CARBON FILM RESISTOR	100 ohm,1/4W	2	R21,25
A0805041104	CARBON FILM RESISTOR	100K ohm,1/4W	1	R7
A0805041102	CARBON FILM RESISTOR	1K ohm,1/4W	4	R1,20,29,32
A0805041105	CARBON FILM RESISTOR	1M ohm,1/4W	3	R2,4,30
A0805041205	CARBON FILM RESISTOR	2M ohm,1/4W	1	R3
A0805041331	CARBON FILM RESISTOR	330K ohm,1/4W	1	R26
A0805041473	CARBON FILM RESISTOR	4.7K ohm,1/4W	2	R27,28
A0805041565	CARBON FILM RESISTOR	5.6M ohm,1/4W	1	R31
A0801001203	TRIMMER	3006P-001-203(20K)	1	VR1
A1301000002	DIP S/W	DS-02(4 PIN)	1	S1(OPTION)
A1100260000	CRYSTAL	6.0MHz	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A0910001080	CONNECTOR (FPC)	8 PIN(ZIF) 90°	1	J2
A0901010120	CONNECTOR (WIRE ARRAY)	12 PIN WAFER	1	J3(PRINTER OPTION)
A0901010040	CONNECTOR (WIRE ARRAY)	4 PIN WAFER	1	J4(RS232 OPTION)
COMMON PARTS				
A0102000297	L.C.D.	UTS-G297JV-W	1	LCD1
A1400000003	EL BACKLIGHT	89 x25 mm	1	EL1
A0201089521	I.C.	89C52	1	U1
A0804042502	METAL FILM RESISTOR	25K ohm,1/4W	1	R1A
E1GS0000000	P.C.B.	GS-10-X	1	

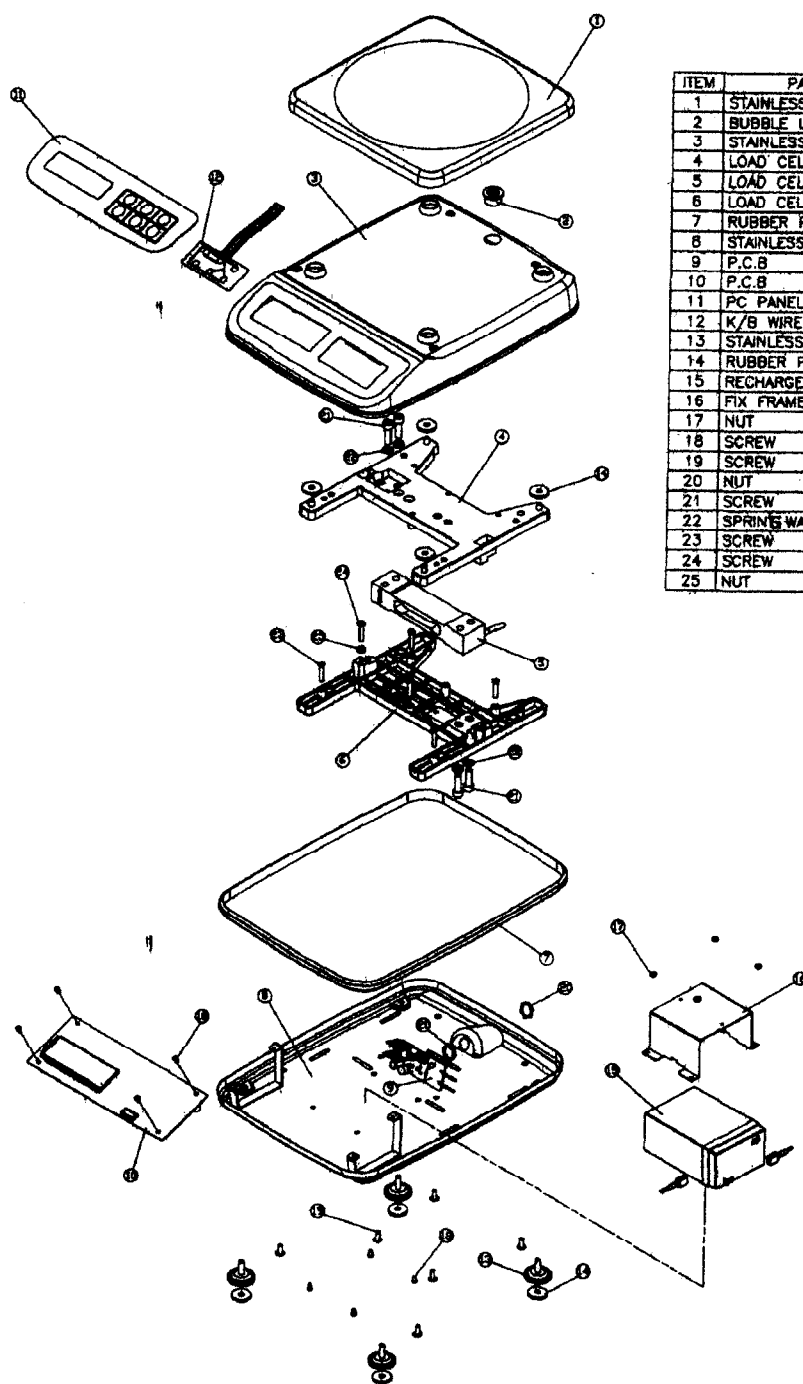
6. PARTS LIST

HGS-20-X CHARGING BOARD

EOHGS010000	P.C.B.	HGS-20-X	1	
A0730104050	CAPACITOR (MLC)	0.1uF/50V(104)	1	C1
A0701477016	CAPACITOR (EC)	470uF/16V	1	C2
A0502000001	BRIDGE RECTIFIER	W04(1A)	1	BR1
A0501004148	DOODE	1N4148	1	D1
A0401009450	TRANSISTOR	2SC945	1	Q2
A0401010610	TRANSISTOR	H1061C OR D880	1	Q1
A0906000210	D.C. JACK	SCD-021 (BLACK)	1	J1
A0805020120	CARBON FILM RESISTOR	1.2 ohm,1/2W	1	R3
A0805021101	CARBON FILM RESISTOR	100 ohm,1/2W	1	R2
A0503020082	ZENER DIODE	1/2W 8.2V(9A3)	1	ZD1
A1204010370	PVC CONDUCTIVE WIRE	37cm (BLACK),26AWG	1	
A1204010372	PVC CONDUCTIVE WIRE	37cm (RED),26AWG	1	
A5004000002	HEAT SINK (U TYPE)	MB-204-20	1	Q1
Z0011000308	SCREW	M3 x 8	1	
Z0016000003	SCREW NUT	M3	1	
A0401007330	TRANSISTOR	A733	1	Q3(OPTION)
A0805041153	CARBON FILM RESISTOR	15K ohm,1/4W	1	R4(OPTION)
A0805041221	CARBON FILM RESISTOR	220 ohm,1/4W	1	R5(OPTION)
A0805041471	CARBON FILM RESISTOR	470 ohm,1/4W	1	R1(OPTION)
A0625050000	L.E.D.	RED/GREEN ROUND 5mm	1	LED1(OPTION)

6. PARTS LIST

PARTS EXPLOSION:



ITEM	PART NAME	DESCRIPTION	QTY
1	STAINLESS PLATTER	GS-SERIES	1
2	BUBBLE LEVEL	#14mm	1
3	STAINLESS UPPER CABINET	GS-SERIES	1
4	LOAD CELL SUPPORTS (U)	G-SERIES	1
5	LOAD CELL		1
6	LOAD CELL SUPPORTS (D)	GS-SERIES	1
7	RUBBER PACKING	GS-SERIES	1
8	STAINLESS UNDER CABINET	GS-SERIES	1
9	P.C.B	HGS-20-X	1
10	P.C.B	GS-10-X	1
11	PC PANEL	GS-SERIES	1
12	K/B WIRE	GS-SERIES, 6 KEYS	1
13	STAINLESS ADJ. FEET	GS-SERIES	1
14	RUBBER PAD	CFR-190603	8
15	RECHARGEABLE BATTERY	8V, 4AH	1
16	FIX FRAME	GS-SERIES	1
17	NUT	M3	4
18	SCREW	M3	8
19	SCREW	M4X10, ROUND	8
20	NUT	SCD-21	2
21	SCREW	M8X20	4
22	SPRINGS WASHER	M7	4
23	SCREW	M4X18, NYLOK	5
24	SCREW	M4X20, ROUND	1
25	NUT	M4	1

AT89C52**Features**

- Compatible with MCS-51™ Products
- 8 Kbytes of In-System Reprogrammable Flash Memory
Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-Level Program Memory Lock
- 256 x 8-Bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-Bit Timer/Counters
- Eight Interrupt Sources
- Programmable Serial Channel
- Low Power Idle and Power Down Modes

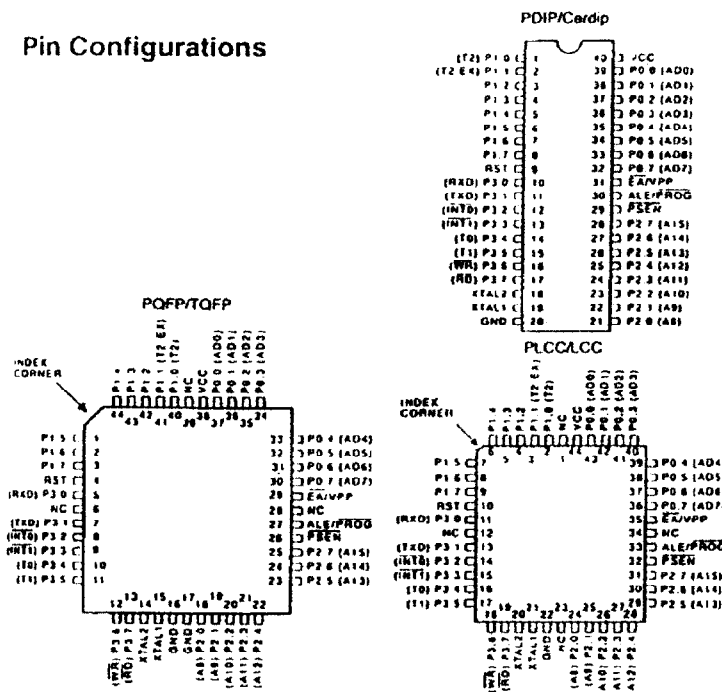
Description

The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8 Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard 80C51 and 80C52 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C52 is a powerful microcomputer which provides a highly flexible and cost effective solution to many embedded control applications.

The AT89C52 provides the following standard features: 8 Kbytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89C52 is

(continued)

8-Bit Microcontroller with 8 Kbytes Flash

Pin Configurations

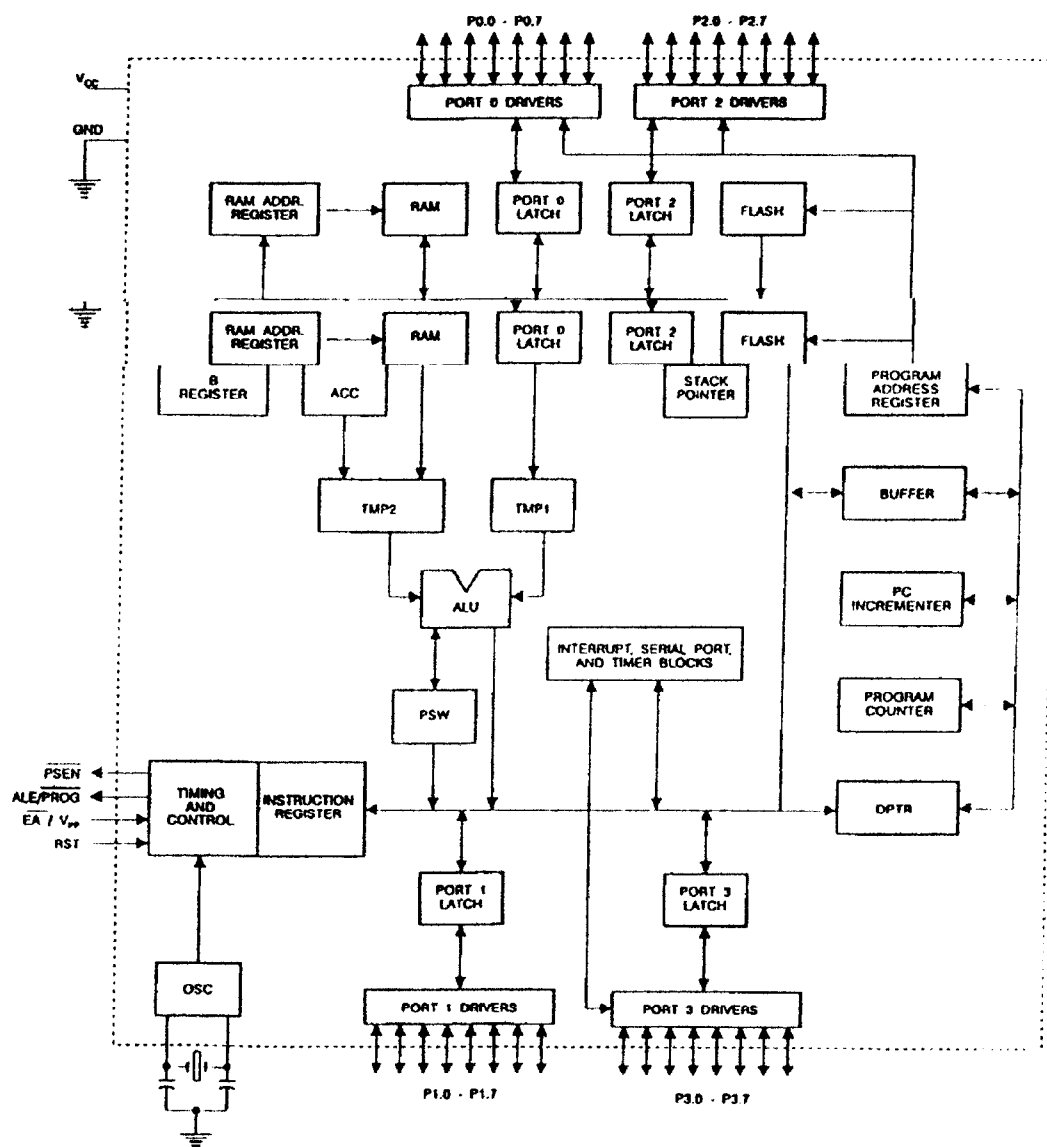
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Block Diagram





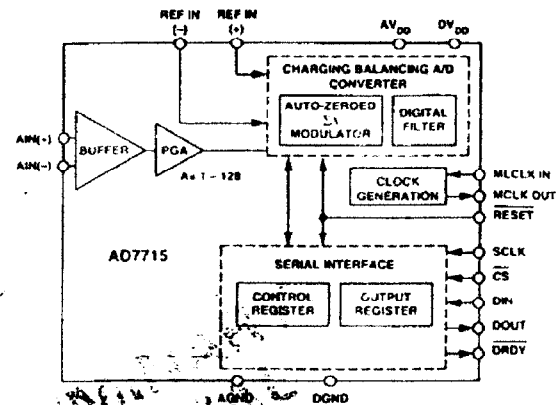
3 V/5 V, Low Cost, Low Power, 16-Bit, Sigma-Delta ADC

AD7715*

FEATURES

Charge-Balancing ADC
 16 Bits No Missing Codes
 0.0015% Nonlinearity
Programmable Gain Front End
 Gains of 1, 2, 32 and 128
Differential Input Capability
Three-Wire Serial Interface
 Ability to Buffer the Analog Input
 3 V or 5 V Single Supply Operation
 Low Supply Current: 500 μ A max @ 3 V Supplies
 Low-Pass Filter with Programmable Output Update
 16-Pin SOIC/DIP

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The AD7715 is a complete analog front end for low frequency measurement applications. The part can accept low level input signals directly from a transducer and outputs a serial digital word. It employs a sigma-delta conversion technique to realize up to 16 bits of no missing codes performance. The input signal is applied to a proprietary programmable gain front end based around an analog modulator. The modulator output is processed by an on-chip digital filter. The first notch of this digital filter can be programmed via the on-chip control register allowing adjustment of the filter cutoff and output update rate.

The AD7715 features a differential analog input as well as a differential reference input. It operates from a single supply (+3 V or +5 V). It can handle unipolar input signal ranges of 0 mV to +20 mV, 0 mV to +80 mV, 0 V to +1.25 V and 0 V to +2.5 V. It can also handle bipolar input signal ranges of ± 20 mV, ± 80 mV, ± 1.25 V and ± 2.5 V. These bipolar ranges are referenced to the negative input of the differential analog input. The AD7715 thus performs all signal conditioning and conversion for a single-channel system.

The AD7715 is ideal for use in smart, microcontroller or DSP based systems. It features a serial interface which can be configured for three-wire operation. Gain settings, signal polarity and update rate selection can be configured in software using the input serial port. The part contains self-calibration and system calibration options to eliminate gain and offset errors on the part itself or in the system.

CMOS construction ensures very low power dissipation and the power-down mode reduces the standby power consumption to 50 μ W typ. The part is available in a 16-pin, 0.3 inch-wide, plastic and hermetic dual-in-line package (DIP) as well as a 16-lead small outline (SOIC) package.

*Protected by U.S. Patent No. 5,134,401.

This is a preliminary data sheet. To obtain the most recent version or complete data sheet, call our fax retrieval system at 1-800-446-6212.

This information applies to a product under development. Its characteristics and specifications are subject to change without notice. Analog Devices assumes no obligation regarding future manufacture unless otherwise agreed to in writing.

PRODUCT HIGHLIGHTS

1. The AD7715 consumes less than 500 μ A in total supply current at 3 V supplies and 1 MHz master clock, making it ideal for use in low-power systems. Standby current is less than 10 μ A.
2. The programmable gain input allows the AD7715 to accept input signals directly from a strain gage or transducer removing a considerable amount of signal conditioning.
3. The AD7715 is ideal for microcontroller or DSP processor applications with a three-wire serial interface reducing the number of interconnect lines and reducing the number of opto-couplers required in isolated systems. The part contains an on-chip registers which allow software control over output update rate, input gain, signal polarity and calibration modes.
4. The part features excellent static performance specifications with 16-bit No Missing Codes, $\pm 0.0015\%$ accuracy and low rms noise (<450 nV). Endpoint errors and the effects of temperature drift are eliminated by on-chip self-calibration, which removes zero-scale and full-scale errors.

μPD7225 CMOS, Intelligent, Alphanumeric LCD Controller/Driver

Description

The μPD7225 is an intelligent peripheral device designed to interface most microprocessors with a wide variety of alphanumeric LCDs. It can directly drive any static or multiplexed LCD containing up to 4 backplanes and up to 32 segments and is easily cascaded for larger LCD applications. The μPD7225 communicates with a host microprocessor through an 8-bit serial interface. It includes a 7-segment numeric and a 14-segment alphanumeric segment decoder to reduce system software requirements. The μPD7225 is manufactured with a low power consumption CMOS process allowing use of a single power supply between 2.7 V and 5.5 V. It is available in a space-saving 52-pin plastic flat package.

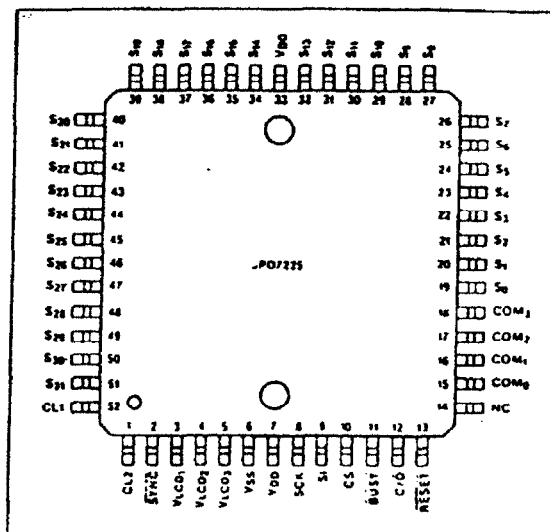
Features

- ☐ Single chip LCD controller with direct LCD drive
- ☐ Low cost serial interface to most microprocessors
- ☐ Compatible with
 - 7-segment numeric LCD configurations up to 16 digits
 - 14-segment alphanumeric LCD configurations up to 8 characters
- ☐ Selectable LCD drive configuration:
 - Static, biphased, triphased, or quadruplexed
- ☐ 32-segment drivers
- ☐ Cascadable for larger LCD applications
- ☐ Selectable LCD bias voltage configuration:
 - Static, 1/2 or 1/3
- ☐ Hardware logic blocks reduce system software requirements
 - 8-bit serial interface
 - Two 32 × 4-bit static RAMs for display data and blinking data storage
 - Programmable segment decoding capability:
 - 16-character, 7-segment numeric decoder
 - 64-character, 14-segment USASCII alphanumeric decoder
 - Programmable segment blinking capability
 - Automatic synchronization of segment drivers with sequentially multiplexed backplane drivers
- ☐ Single power supply, variable from 2.7 V to 5.5 V
- ☐ Low power consumption CMOS technology
- ☐ Extended — 40°C to +85°C temperature range available

Ordering Information

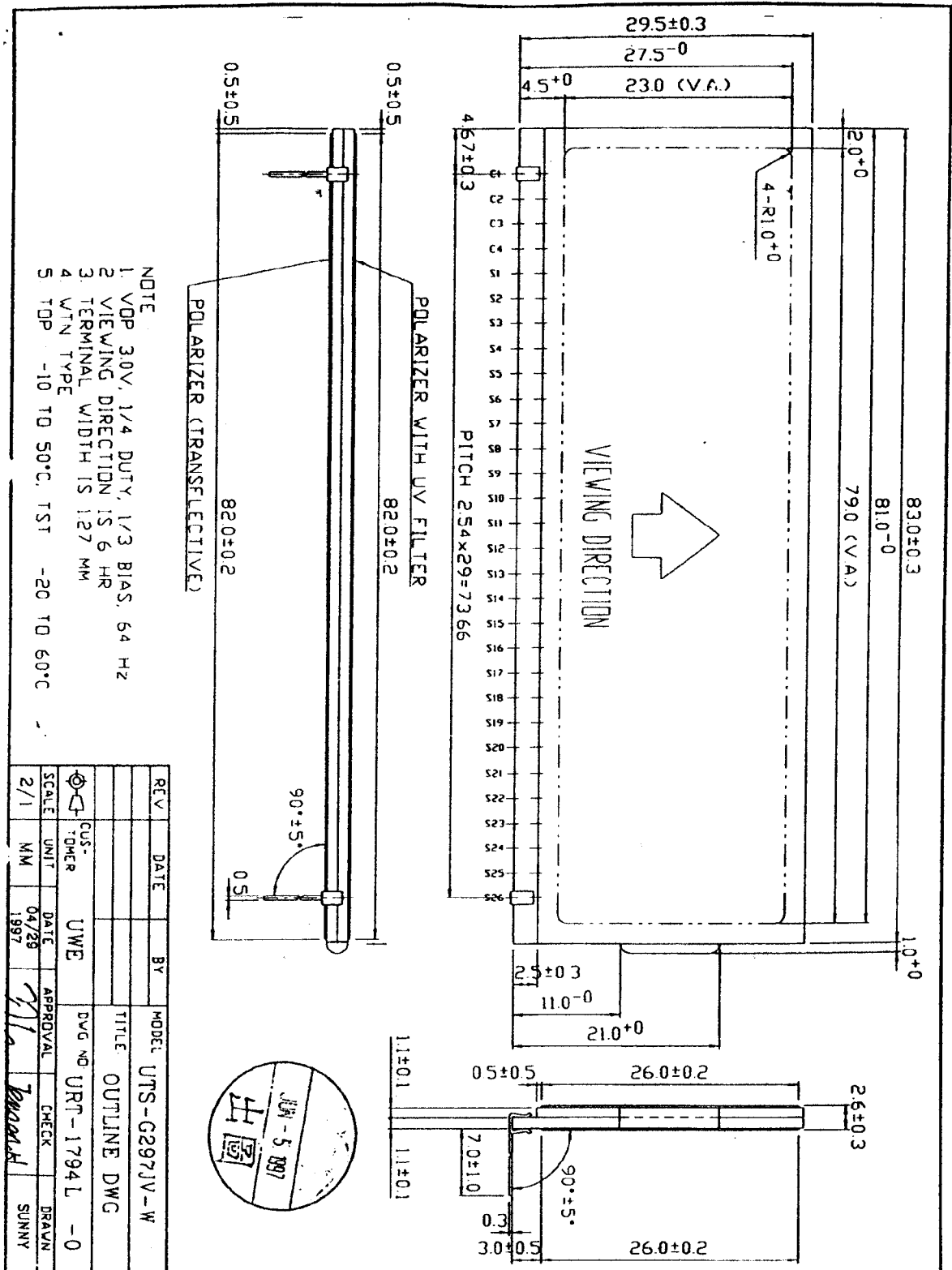
Part Number	Package Type	Max Frequency of Operation
μPD7225G-00	52-pin plastic miniflat	1 MHz

Pin Configuration

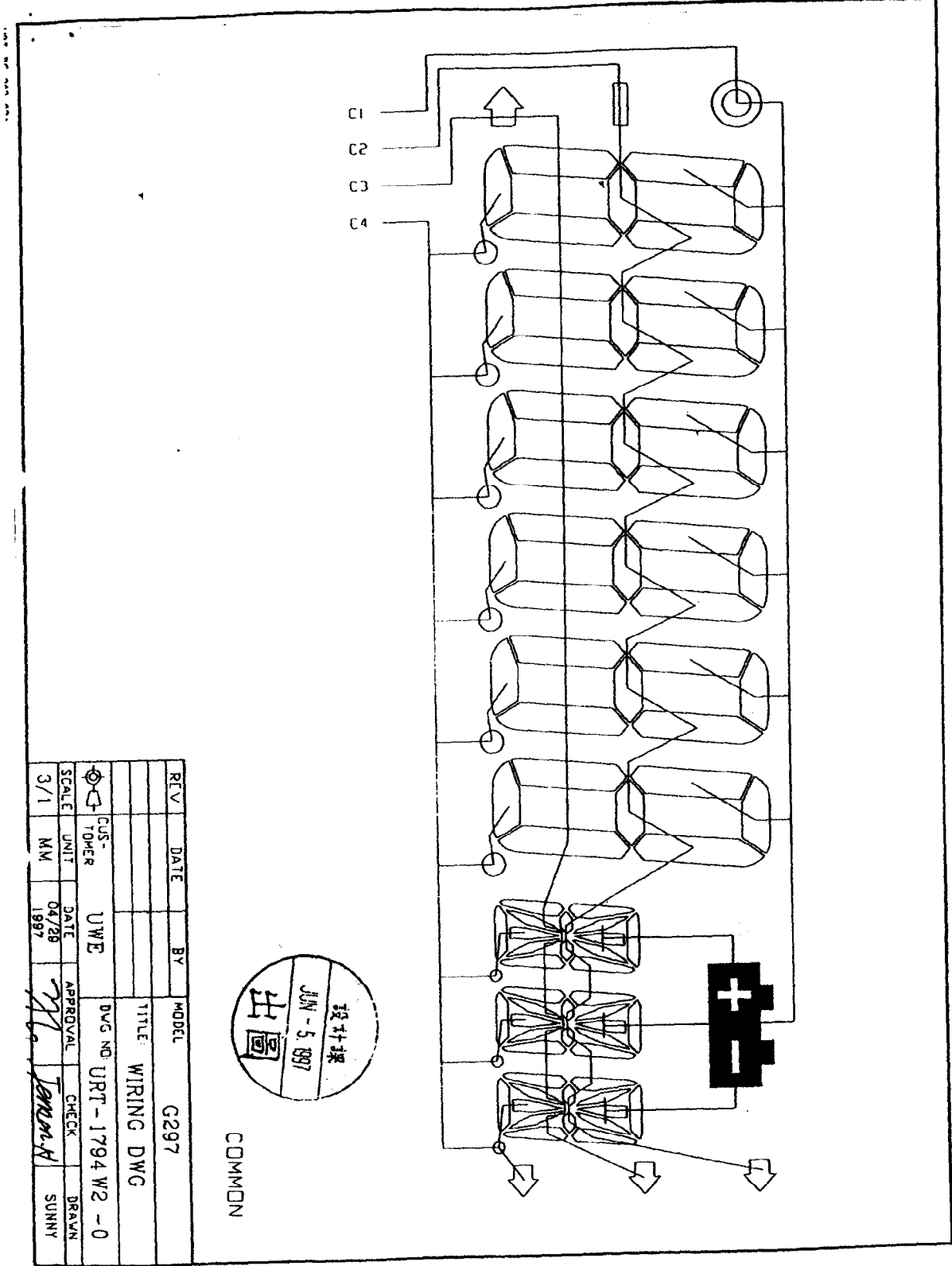


Pin Identification

No.	Symbol	Function
1	CL2	System clock output
2	SYNC	Synchronization port
3-5	VLCD1, VLCD2, VLCD3	LCD bias voltage supply inputs
6	VSS	Ground
7, 33	VDD	Power
8	SCK	Serial clock input
9	SI	Serial input
10	CS	Chip select
11	BUSY	Busy output
12	C/D	Command or data select input
13	RESET	Reset input
14	NC	No connection
15-18	COM0-COM3	LCD backplane driver outputs
19-32, 34-51	S0-S31	LCD segment driver outputs
52	CL1	System clock input

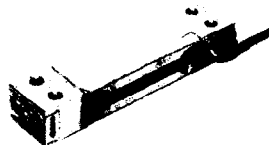


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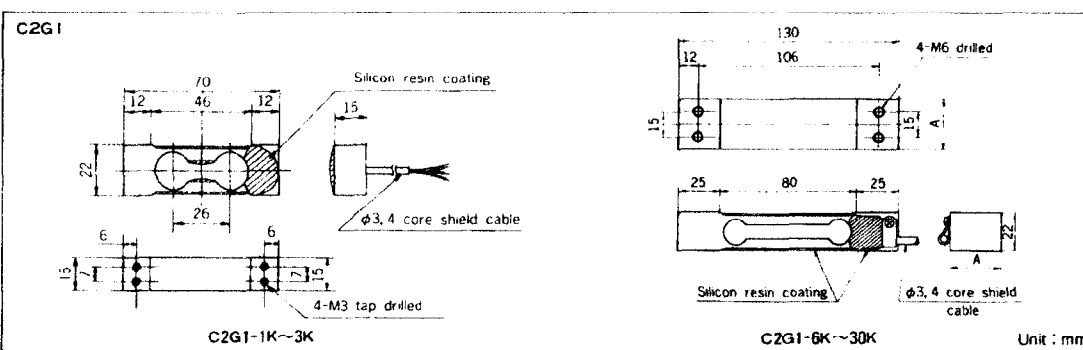
FOR ELECTRONIC SCALE

C2G1
Off-center
load cell



Specifications

MODEL	C2G1-1K~3K	C2G1-6K~30K
Rated capacity	1, 2, 3kgf	6, 10, 12, 15, 20, 25, 30kgf
Rated output	Approx. 1mV/V	Approx. 2mV/V
Non-linearity	0.02%R.O.	0.02%R.O.
Hysteresis	0.02%R.O.	0.02%R.O.
Repeatability	0.02%R.O.	0.02%R.O.
Creep	0.03%R.O./20min	0.02%R.O./20min
Creep Recovery	0.03%R.O./20min	0.02%R.O./20min
Excitation, recommended	10V	12V
Maximum	15V	20V
Zero balance	±5%R.O.	±5%R.O.
Terminal resistance, input	Approx. 400 Ω	Approx. 400 Ω
output	350 ± 5 Ω	350 ± 5 Ω
Length of cable	φ3, 40cm (4 core shield cable)	φ3, 40cm (4 core shield cable)
Insulation resistance	2000M Ω or more	2000M Ω or more
Temp. range, compensated	-10~50℃	-10~50℃
Safe	-10~50℃	-10~50℃
Temp. effect on zero balance	0.04%R.O./10℃	0.04%R.O./10℃
Temp. effect on output	0.012%LOAD/10℃	0.012%LOAD/10℃
Safe overload	300%R.C.	150%R.C.
Ultimate overload	400%R.C.	200%R.C.
Weight	Approx. 45g	



Model	Rated C.	A	Weight Approx.(g)
C2G1-6K	6 kgf	30	200
C2G1-10K	10kgf	30	200
C2G1-12K	12kgf	30	200
C2G1-15K	15kgf	30	200
C2G1-20K	20kgf	30	200
C2G1-25K	25kgf	40	260
C2G1-30K	30kgf	40	260

LOAD CELLS

2

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