

MAINTENANCE MANUAL

XM SERIES

MODELS: XM-1000 XM-2000 XM-4000
XM-10K XM-20K
XM-3000 XM-6000 XM-15K

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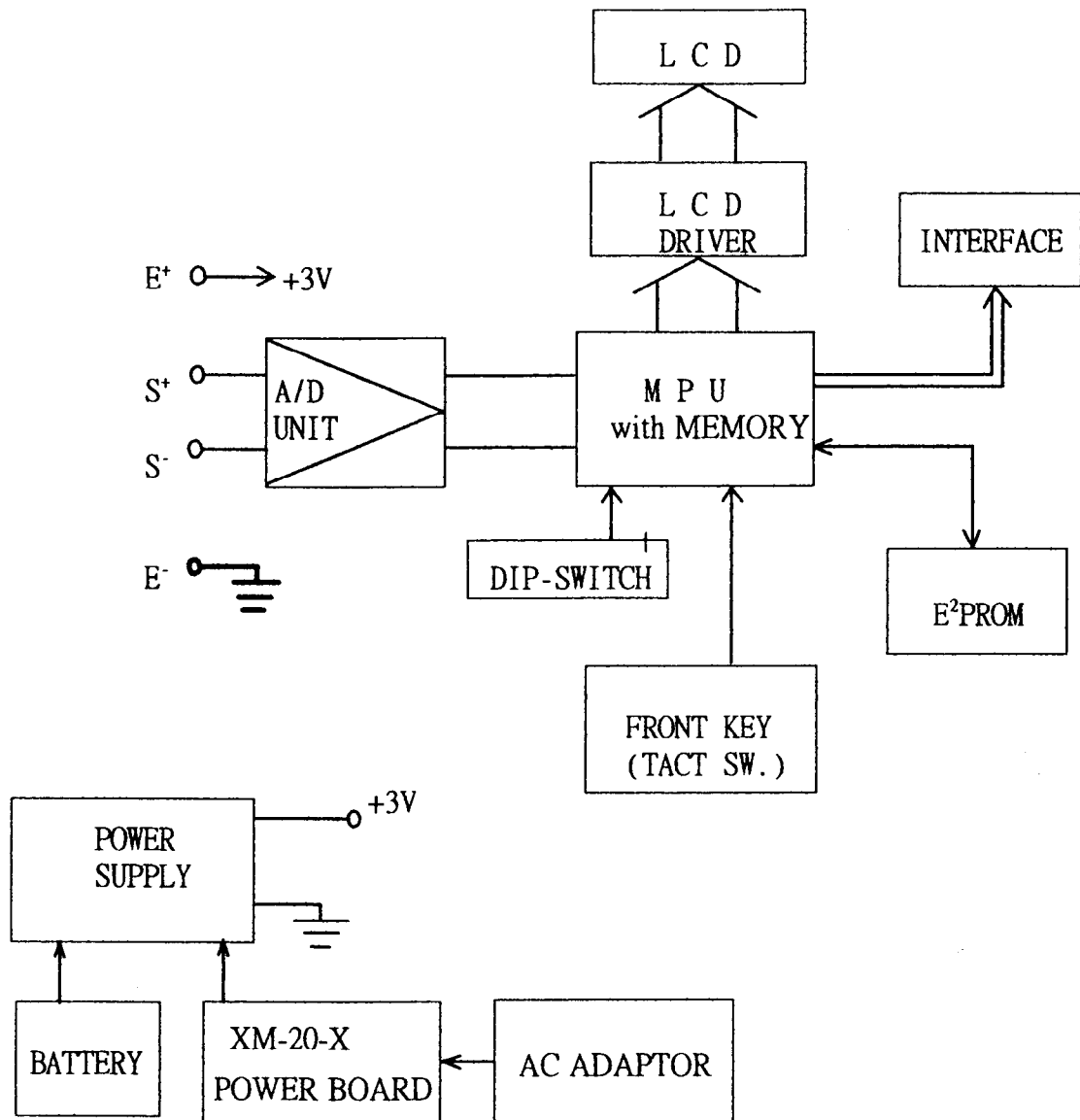
XM SERIES - ELECTRONIC WEIGHING SCALE

1. FEATURES:

- * Full Tare
- * Tare Indicator
- * Zero Indicator
- * Negative Value Indicator
- * 2 Types of Calibration
- * Dip Switch to prevent end-user calibration
- * Sealable
- * Optional Bubble Level
- * Adjustable Feet
- * Optional Backlighting
- * 5 1/2 x 25mm Wide Angle LCD Display
- * Cockroach Resistance Design
- * Long Battery Operating Time
1500 Hours plus with 4 x Size D Alkaline Battery
- * Low-battery Signal
- * Auto Power Saving Function
- * Optional AC Adaptor operated
- * Optional Rear Display
- * Optional Stainless Steel Platter Cover
- * Optional RS-232C or Printer Interface
- * Overload protection for positive and negative force
- * Capacity: 1kg,2kg,4kg,10kg,20kg for 1/2000 resolution
3kg,6kg for 1/6000 resolution
15kg for 1/7500 resolution

2. SPECIFICATION

1. SYSTEM BLOCK DIAGRAM



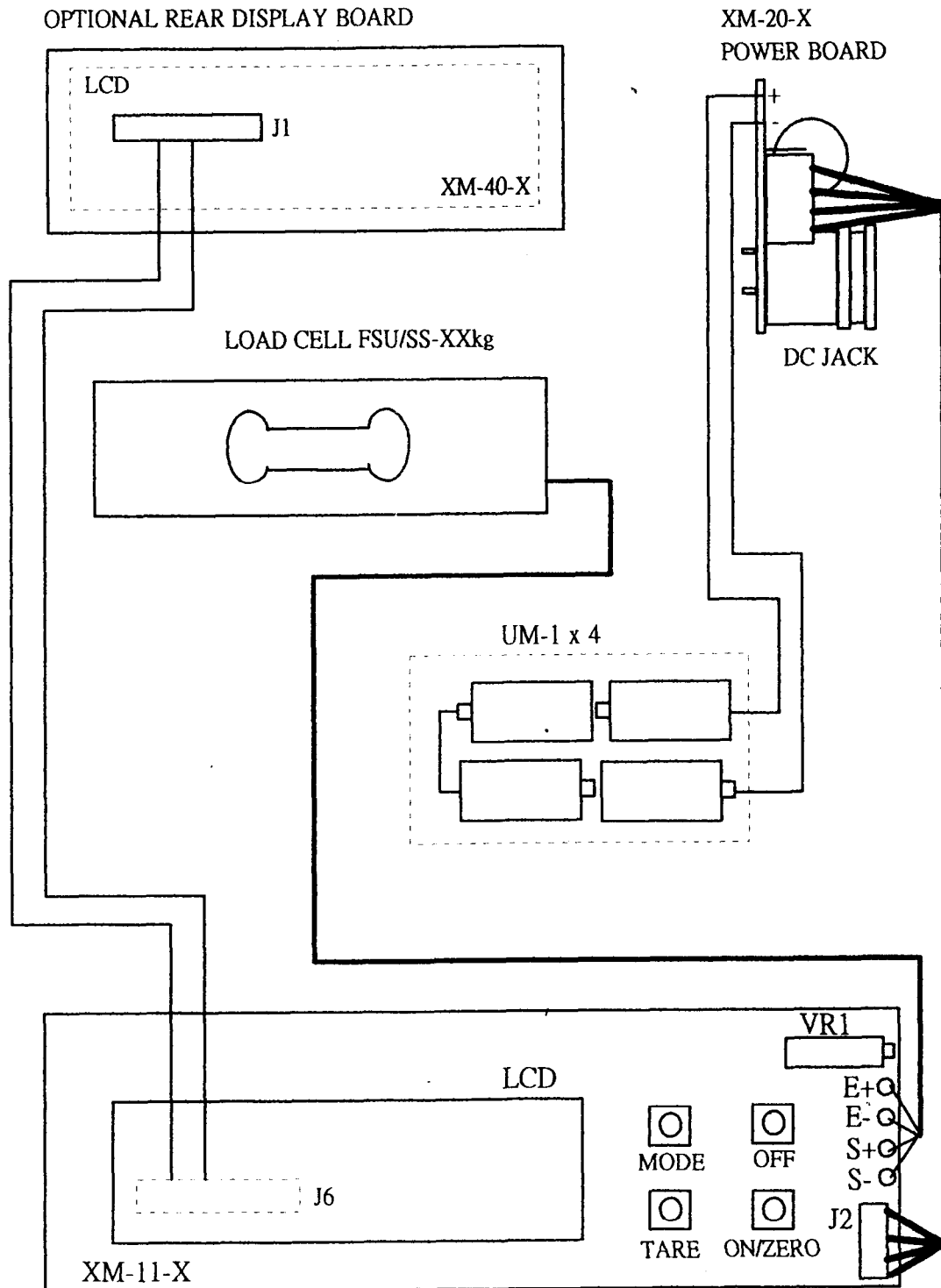
DESCRIPTION:

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.

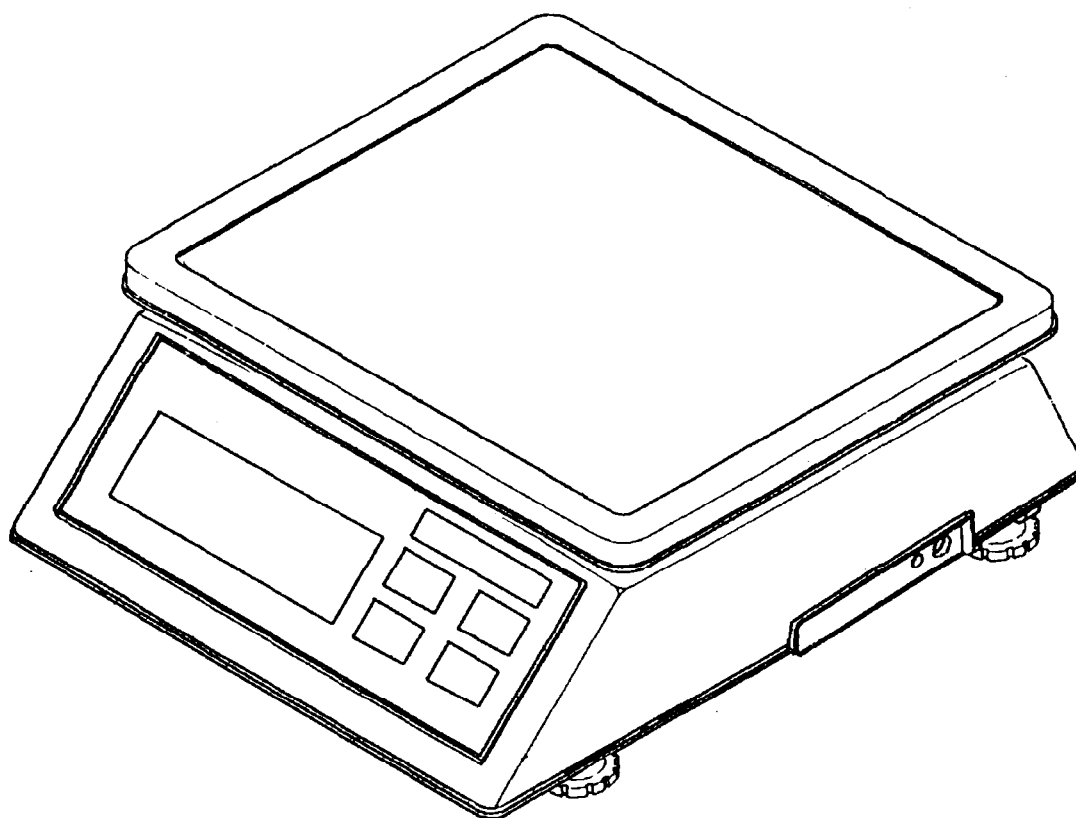
2. PHYSICAL LAYOUT OF ELECTRICAL CONNECTION



2. SPECIFICATION

3. GENERAL SPECIFICATION

3.1 Overall View



3. GENERAL SPECIFICATION

3.2 Dimension

* Platter size: 250 x 215mm

* Overall size: 250(W) x 285(D) x 105(H)mm

3.3 Model specification

Model name: XM series

Display resolution: 1/2000(1kg,2kg,4kg,10kg,20kg)

1/6000(3kg,6kg)

1/7500(15kg)

Internal resolution: 1/30000

Display: Single-sided, Double-sided if request

Weight display--> 5 digits

3.4 Operation condition

* Power source: UM-1 (Size D) x 4 battery or AC adaptor
DC9~12V, 100mA

* Operating Temperature: 0 °C ~ 40 °C

* Operating Humidity : 15 ~ 85% RH

* Power Consumption : 0.1W

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 : 0.5mV/V(FSU TYPE LOAD CELL)
2mV/V(SS- TYPE LOAD CELL)

* ZERO ADJUST RANGE : 2% R.O.

* ZERO BALANCE RANGE : +/-5% R.O.

* L/C APPLIED VOLTAGE : DC 3V

* SPEED OF A/D CONVERSION : 10 times/sec

* INTERNAL RESOLUTION : 30000

3.7 Model VS. Capacity & division

MODEL NO.	CAPACITY	EXTERNAL DIVISION
		1/2000
XM-1000	1kg	0.5g
XM-2000	2kg	1g
XM-4000	4kg	2g
XM-10K	10kg	5g
XM-20K	20kg	10g
		1/6000
XM-3000	3kg	0.5g
XM-6000	6kg	1g
		1/7500
XM-15K	15kg	2g

3. INITIAL SETUP

1. INTERNAL FUNCTIONS AND SETTING METHODS

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

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

F.1 Span Value Reading and Dealer Calibration

- a. Simply enter F.1 to read the A/D counts.
- b. Press ON/ZERO to clear the A/D counts, apply test mass onto platter, the span value of test mass will be displayed.
- c. Refer to Dealer Calibration procedures for dealer calibration.

F.2 Display Segment and Rated Capacity & Division Check

When function is entered, all segment will be displayed. Check and make sure that no segments are missed.

F.3 Total Internal Count Checking and Scale Configuration

- 1 Enter F.3, scale displays the Offset Value when unloaded.
- 2 Apply extra load onto platter, the total internal count value will be displayed.

SELECT WEIGHT UNITS

- 1 Press and hold MODE until the weight unit appears.
- 2 To employ all(metric and pound) weight units, press MODE until lb appears. To disable pound weight unit, press MODE until kg appears.
- 3 Press ON/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
unused.

3. INITIAL SETUP

2. AUTO AND DEALER CALIBRATION PROCEDURES

ACCEPTABLE LOAD FOR AUTO AND DEALER CALIBRATION

Model Number	External Division	Acceptable Auto and Dealer Calibration Load	
XM-1000	1/2000	500g	1kg
XM-2000	1/2000	1kg	2kg
XM-4000	1/2000	2kg	4kg
XM-10K	1/2000	5kg	10kg
XM-20K	1/2000	10kg	20kg
XM-3000	1/6000	1kg	2kg
XM-6000	1/6000	2kg	5kg
XM-15K	1/7500	5kg	10kg

Dealer Calibration Procedures:

- 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 ON/ZERO
- 7 Press TARE
- 8 Press ON/ZERO
- 9 Press TARE
- 10 Press ON/ZERO, scale displays a circle 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.
- 10 Load calibration either load as listed on above table.
- 11 When value displayed is stable, press MODE.
- 12 Wait until the scale start count down.
- 13 Calibration completed and scale is ready for operation.

Auto Calibration Procedures:

- 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.

3. INITIAL SETUP

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
XM-1000	1/2000	10-14	10-15 at 500g 20-30 at 1kg	VR1 Trimmer	56K
XM-2000	1/2000	10-14	10-15 at 1kg 20-30 at 2kg	VR1 Trimmer	56K
XM-4000	1/2000	10-14	10-15 at 2kg 20-30 at 4kg	VR1 Trimmer	56K
XM-10K	1/2000	10-14	10-15 at 5kg 20-30 at 10kg	VR1 Trimmer	30K
XM-20K	1/2000	10-14	10-15 at 10kg 20-30 at 20kg	VR1 Trimmer	30K
XM-3000	1/6000	10-14	10-15 at 1kg 20-30 at 2kg	VR1 Trimmer	36K
XM-6000	1/6000	10-14	10-15 at 2kg 25-37.5 at 5kg	VR1 Trimmer	30K
XM-15K	1/7500	10-14	10-15 at 5kg 20-30 at 10kg	VR1 Trimmer	23.2K

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

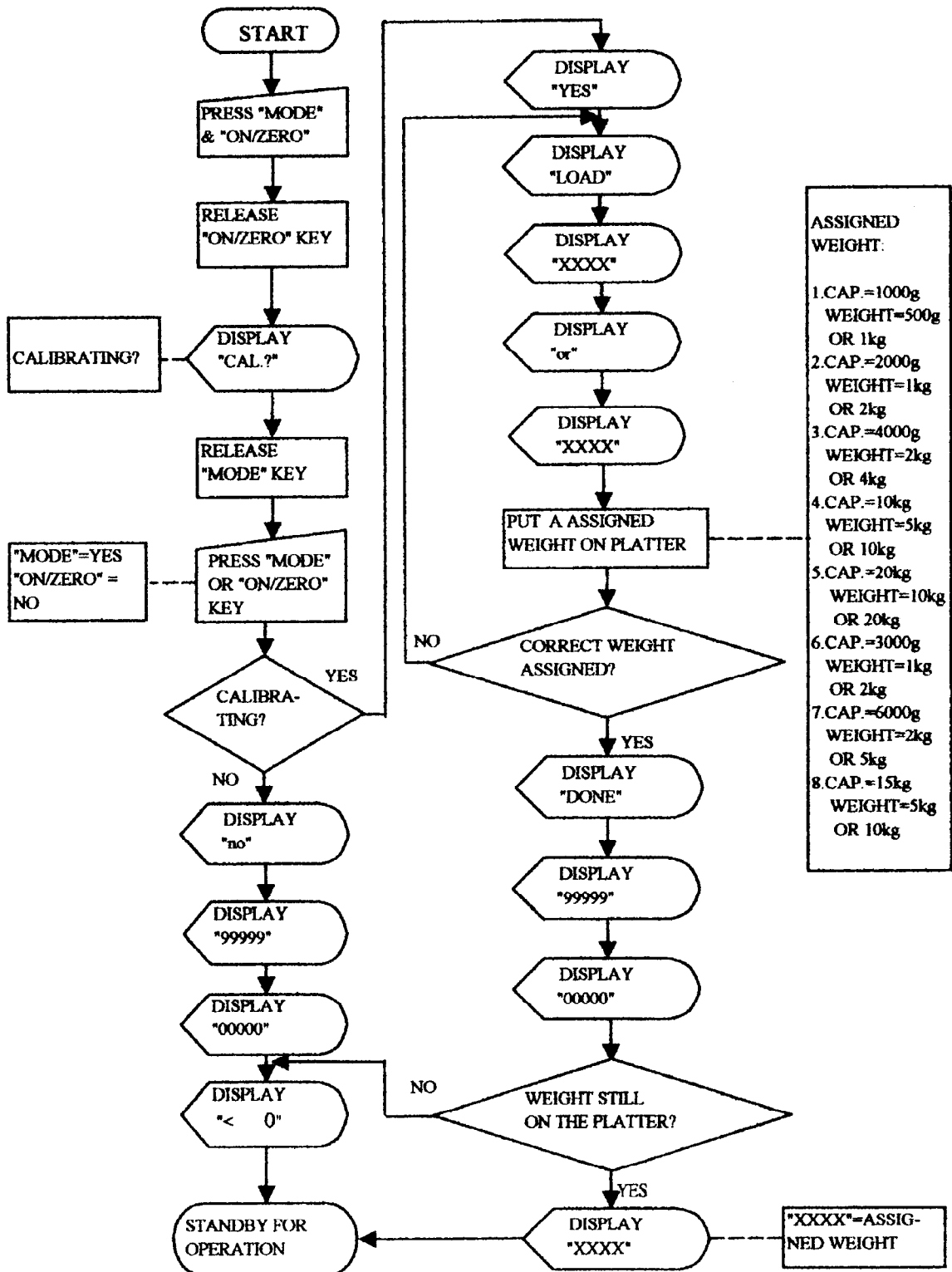
The span value is controlled by resistor located on R1A, standard resistor value of R1A is listed on the above table. If the required span value is not attained, then change R1A resistor according to either case below:

Span value too low : Increase the resistance of R1A.

Span value too high : Decrease the resistance of R1A.

5. FLOW CHART

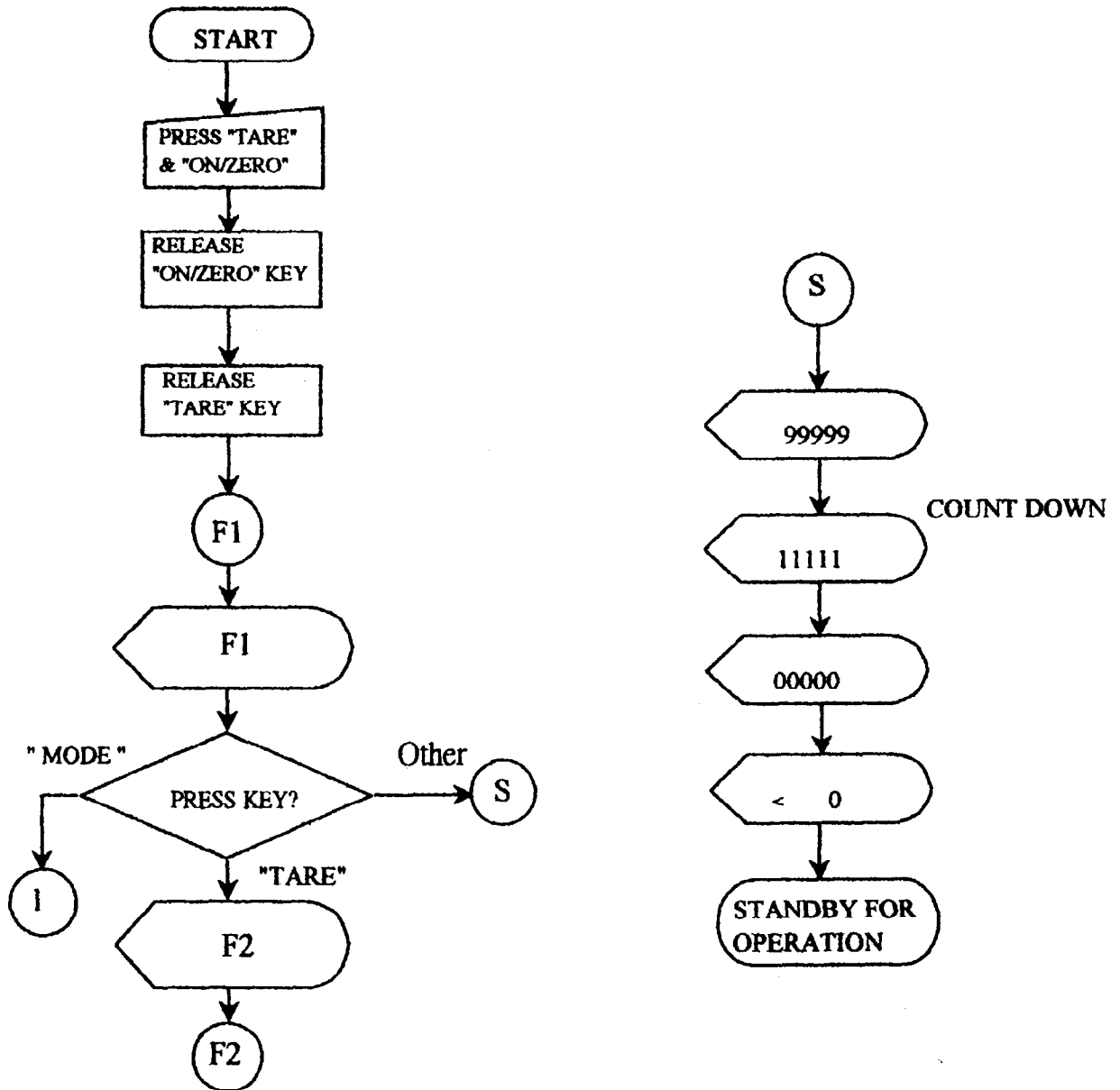
5.1 Auto Calibration(for end-user)

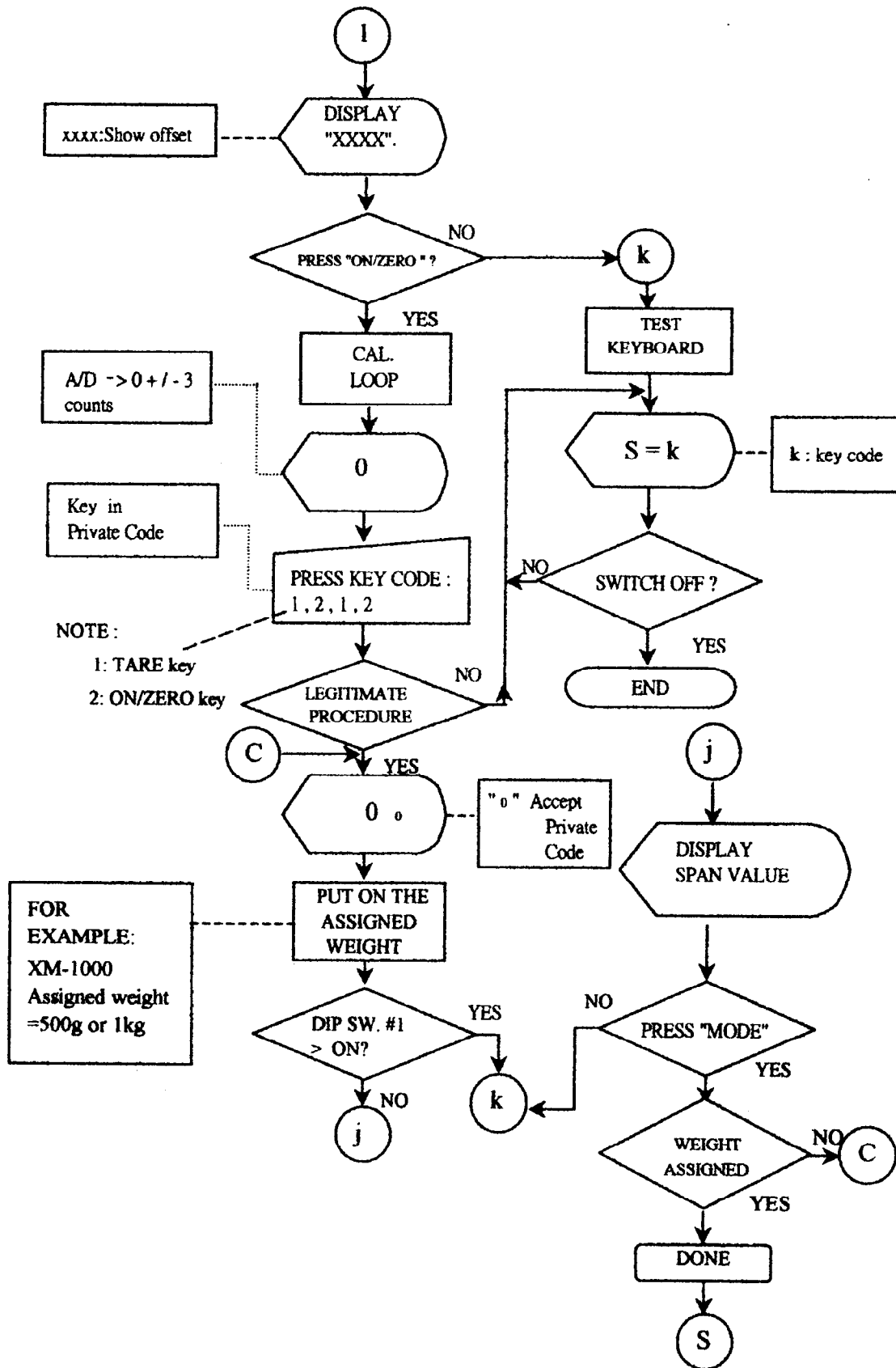


3. INITIAL SETUP

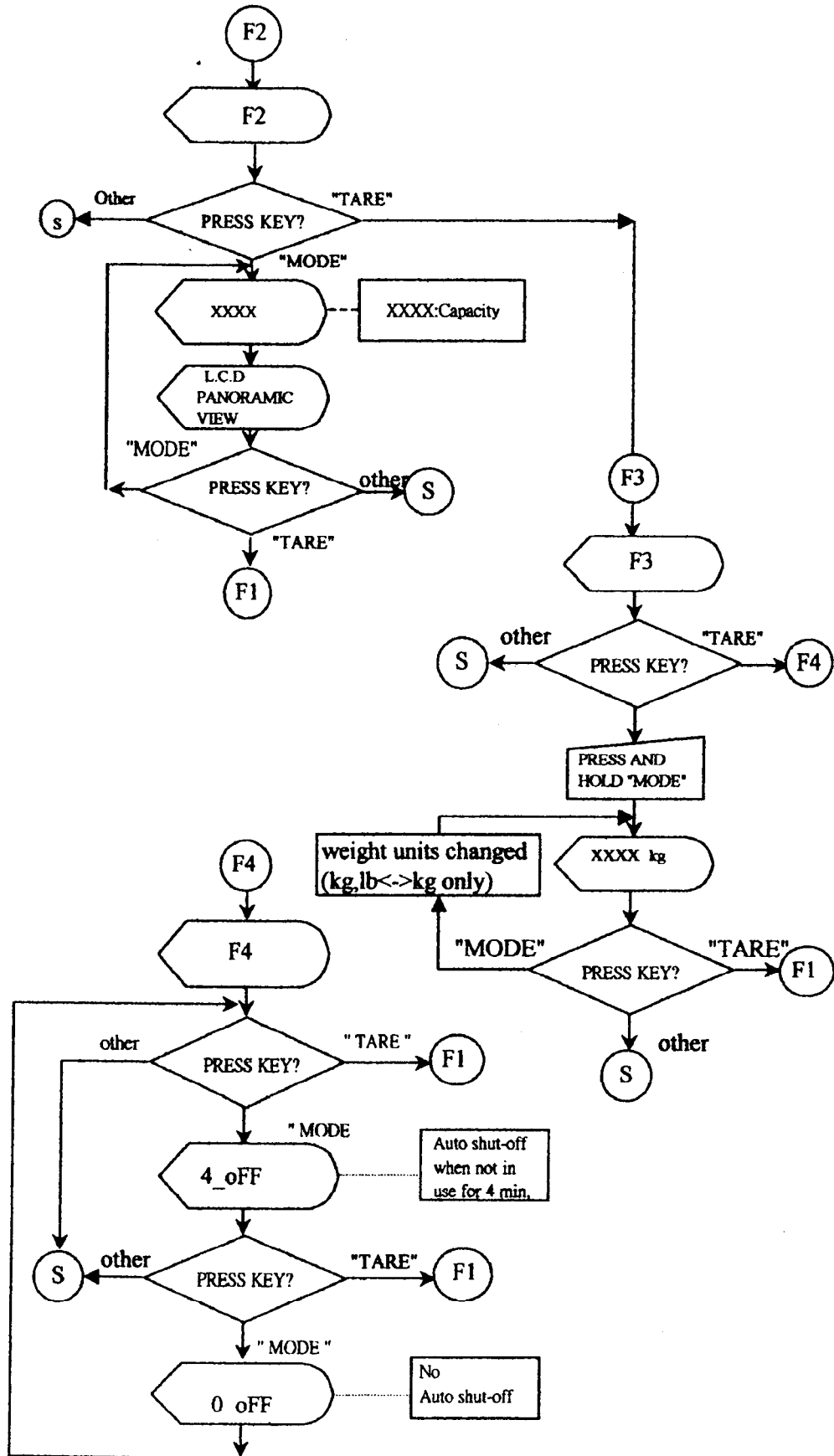
5. FLOW CHART

5.2 Function Test(for technicians only)

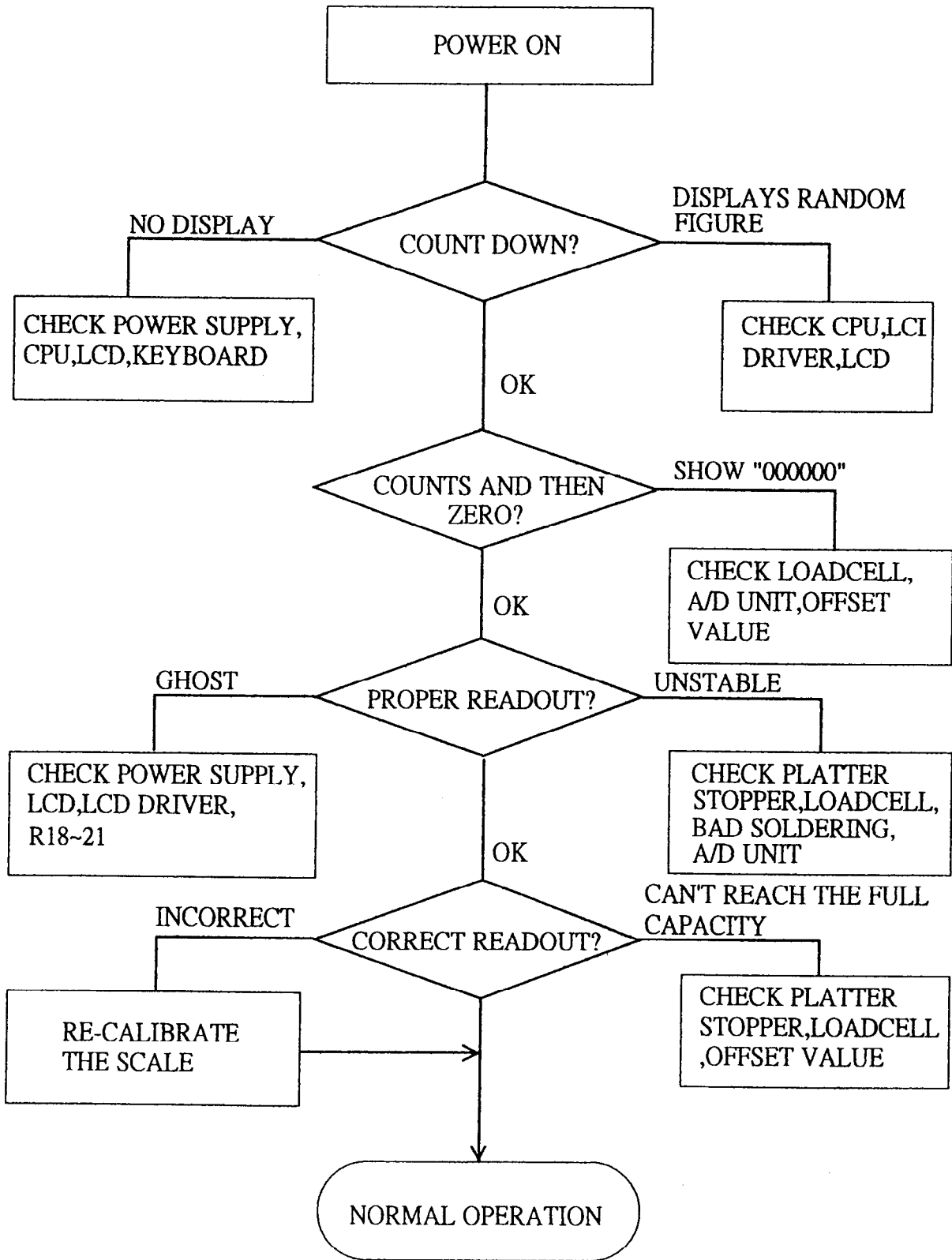




3. INITIAL SETUP



1. TROUBLE SHOOTING LOOP



4. TROUBLE SHOOTING

2. PARTS AND COMPONENTS TROUBLE SHOOTING

2.1 Power Supply Checking

2.1.1 Relevant parts:

Power Board(XM-20-X)

U1(78L08)

D1(1N4002)

C1(1000uF/16V)

DC-JACK(SCD-22)

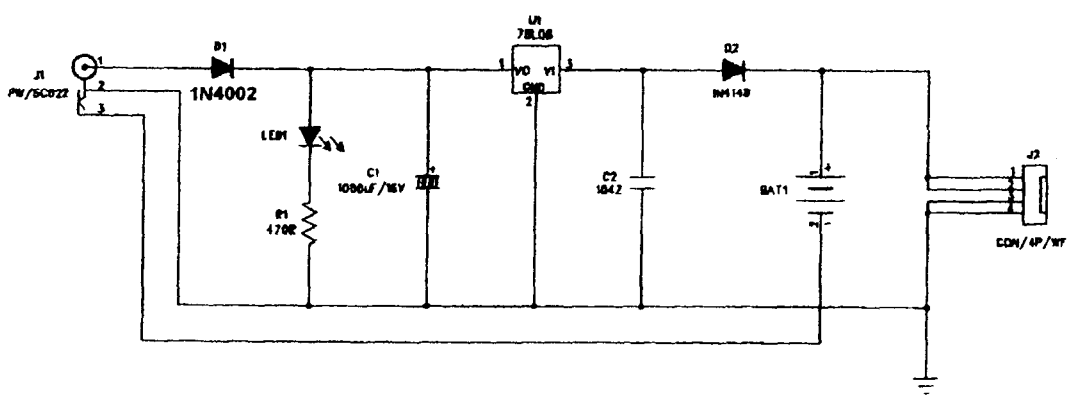
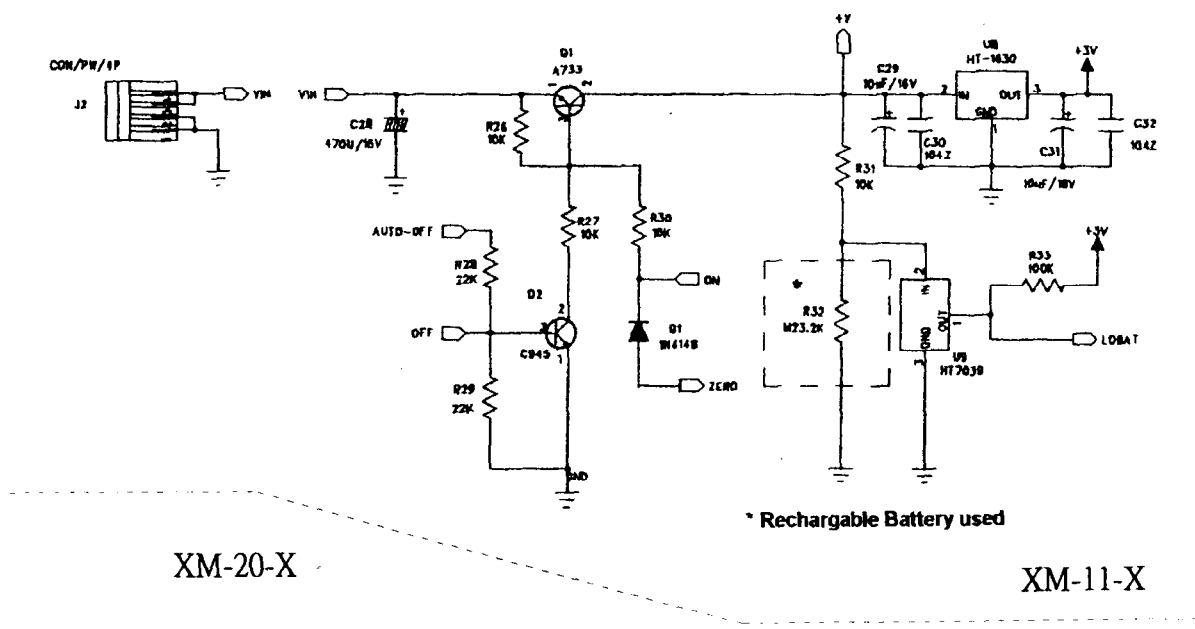
Main Board(XM-11-X)

Q1(A733)

Q2(C945)

U9(HT-7039)

U8(HT-1030)



Description:

- 1) AC Adaptor: This AC Adaptor provides power for DC9~12V,100mA
 - 2) Battery: UM-1(Size D) Battery x4
 - 3) +3V power drives analog and digital circuit system. U8(HT-1030) is a 3volts Voltage Regulator.
 - 4) Auto-off:
If the scale is set on 4_off or even under LO-BAT situation, after some minutes the CPU will release a low potential signal to draw-down the Q2, then Q1 cuts off, the scale will shut down immediately.
 - 7) Low Power Detection:
The U9(HT-7039) is designed to detect the power level.
Whenever the battery 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.
- 2.1.2 Input voltage: 4.5V or higher
Check and replace battery if voltage less than 4.5V.
Check DC-JACK or AC Adaptor if been defective.
- 2.1.3 System voltage(Vcc): 3V +/- 10%
Check that the system 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

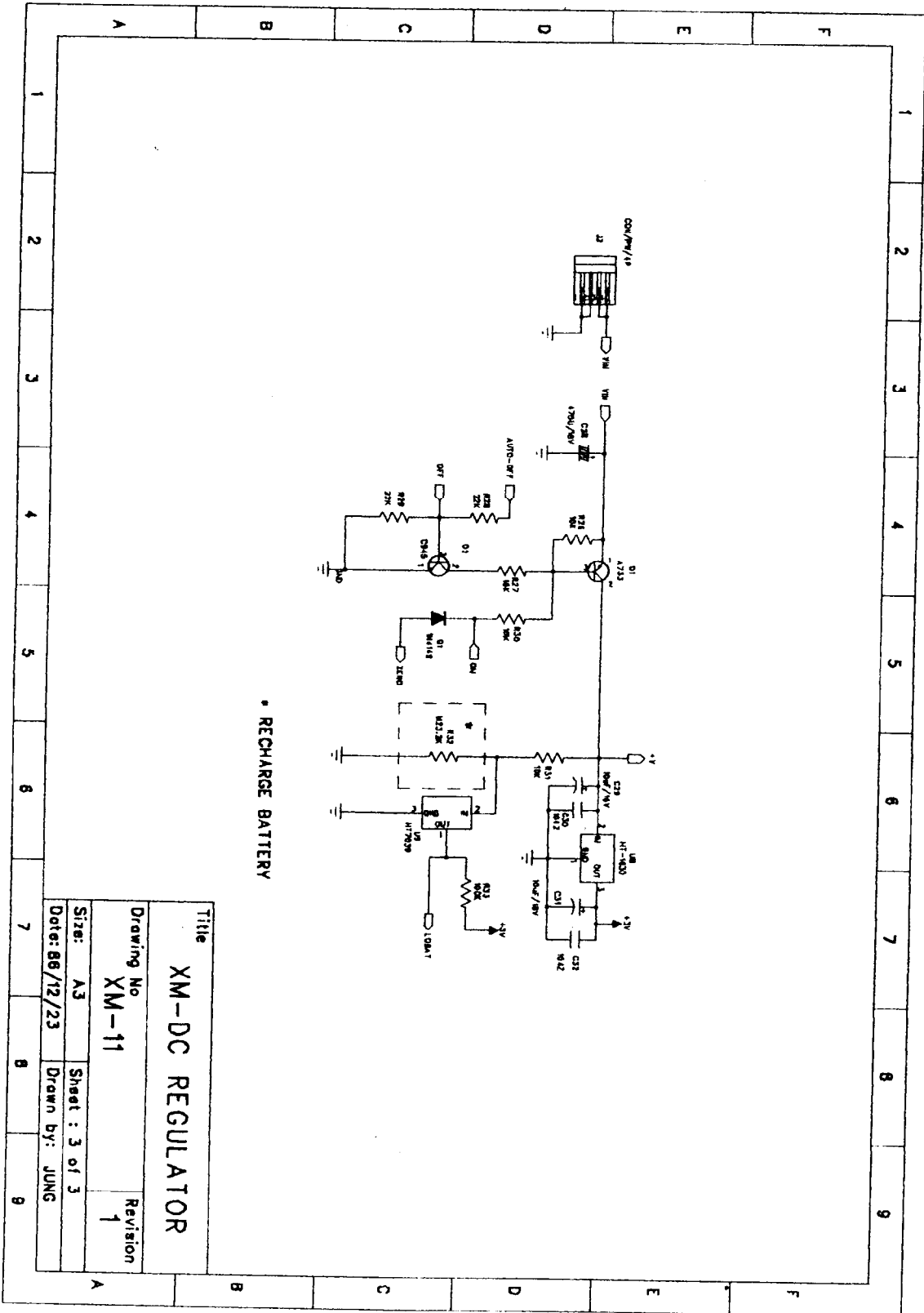
2.5.1 Check that the +3V power is correctly fed to the A/D unit.

2.5.2 Check that the signal output of loadcell is normal.

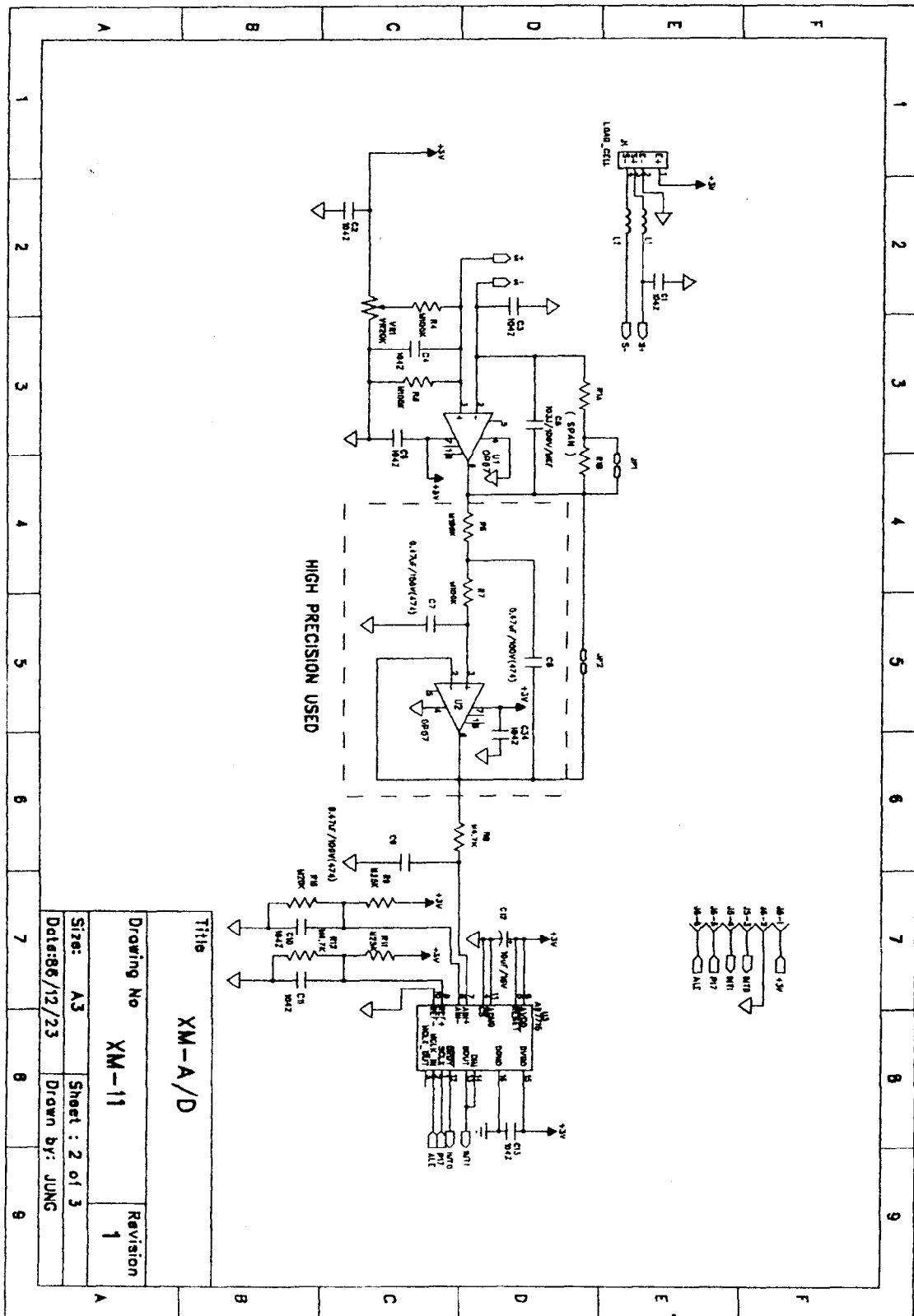
2.5.3 Check OP. Amplifier & A/D Converter(AD7715).

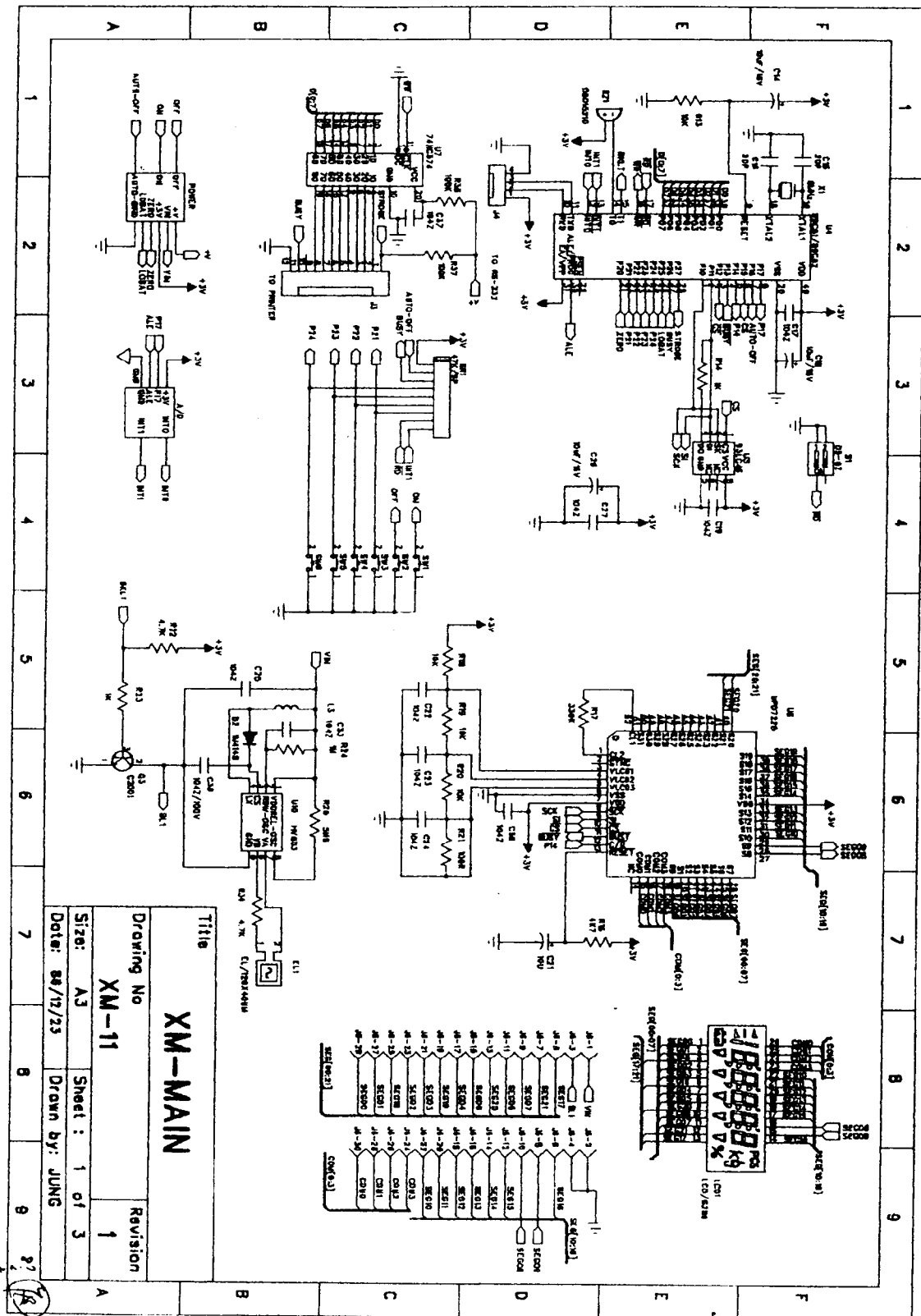
When no error is found with the above checking procedures, the trouble can be caused on the loadcell or the PCB itself. Replace a new one could be better to identify the defective. In this way, the readout of weight would be varied because of the output voltage of loadcell and different span value, so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

1. SCHEMATICS



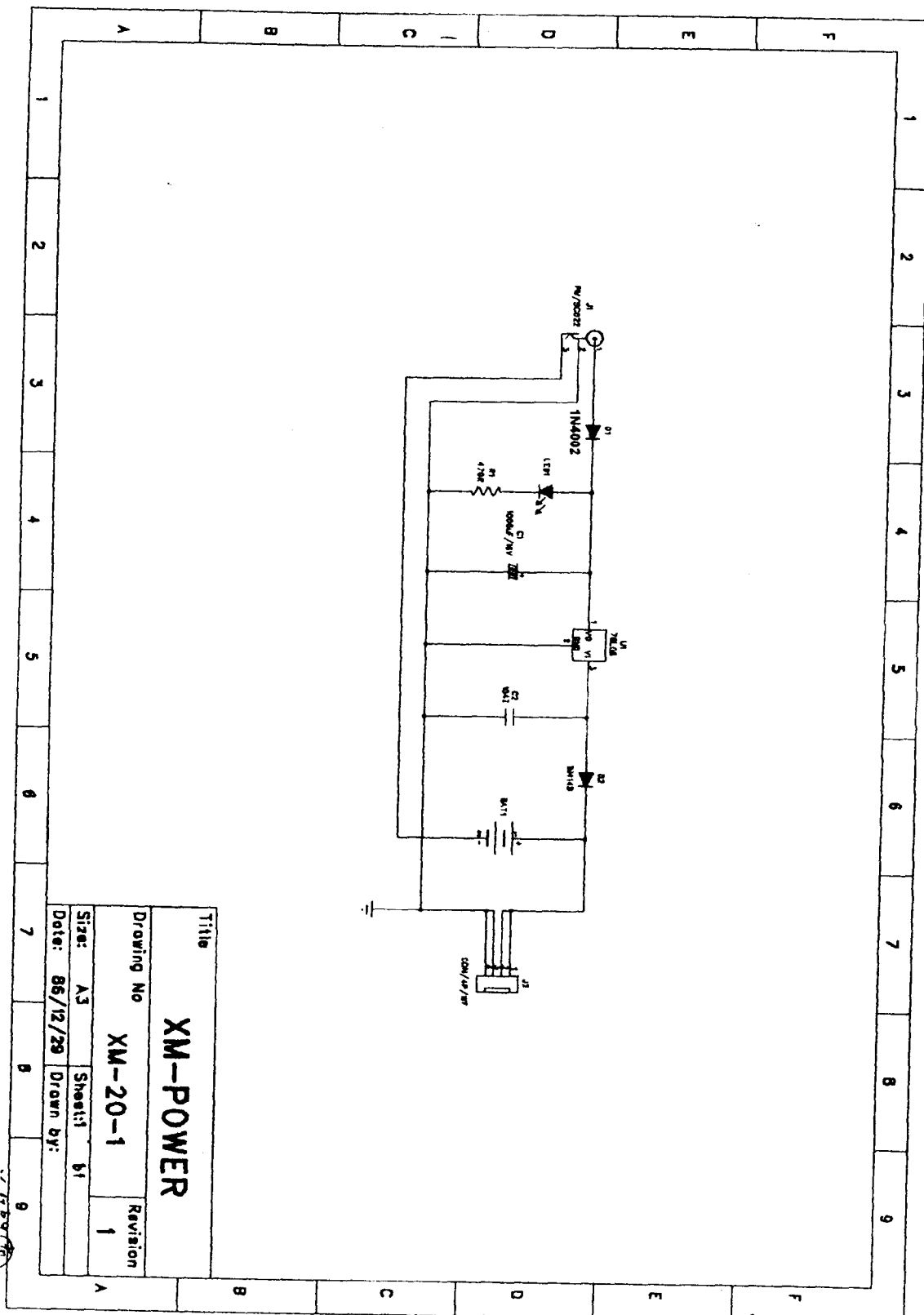
5. ELECTRICAL CIRCUITRY

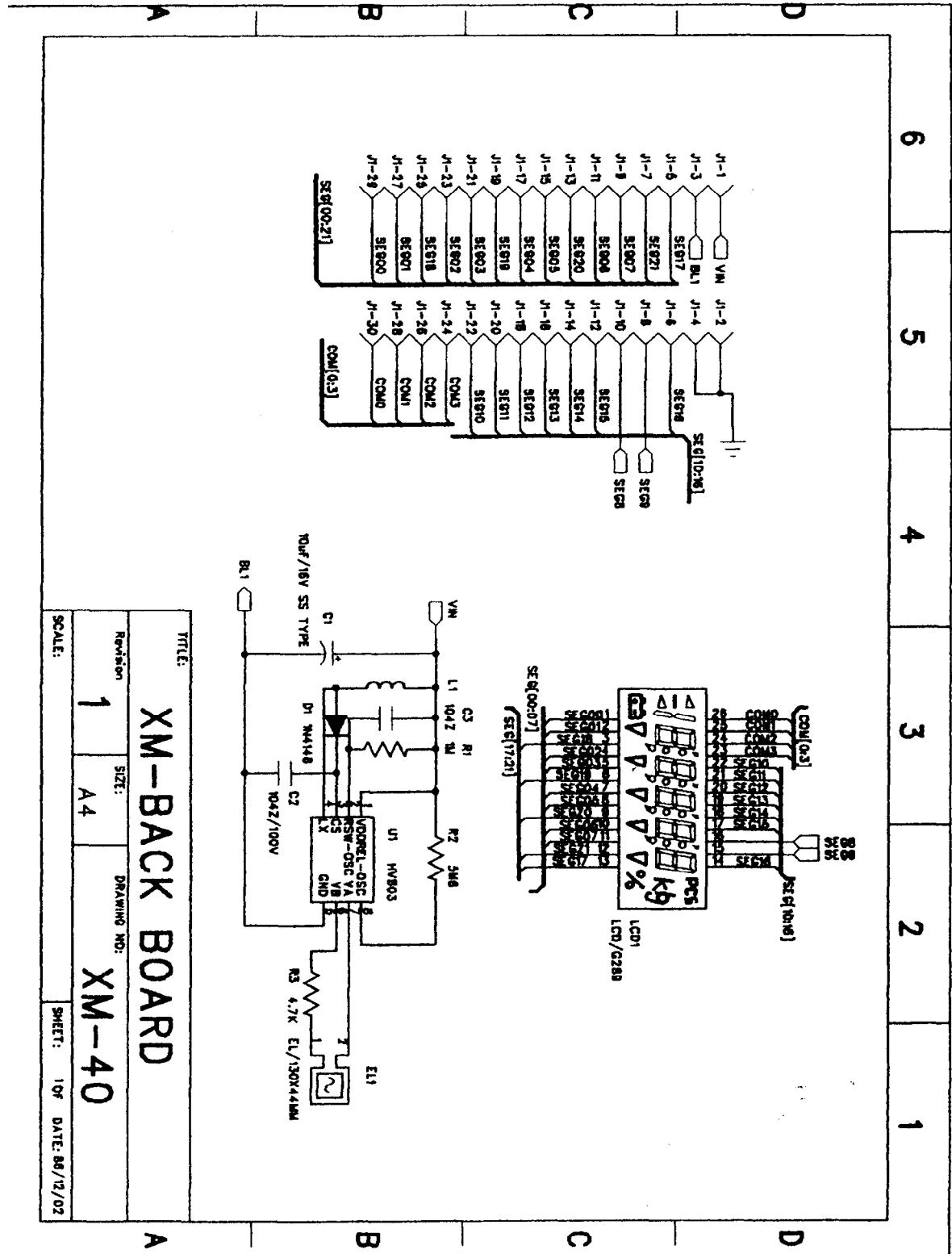




Title		XM-MAIN	
Drawing No		XM-11	
Size: A3		Sheet : 1 of 3	
Date: 88/12/23		Drawn by: JUNG	
Revision		1	

5. ELECTRICAL CIRCUITRY

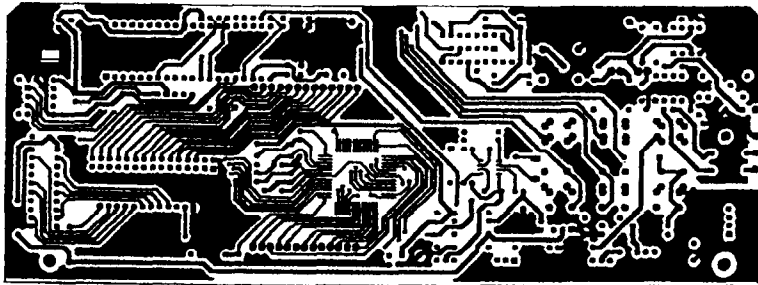




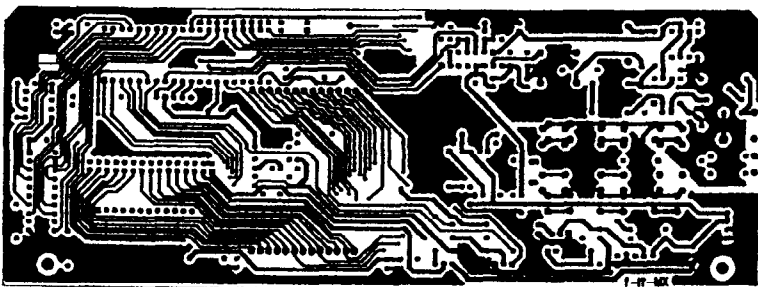
TITLE: XM-BACK BOARD			
Revision	SIZE:	DRAWING NO:	
1	A4	XM-40	
SCALE:		SHEET:	DATE:
		10F	88/12/02

5. ELECTRICAL CIRCUITRY

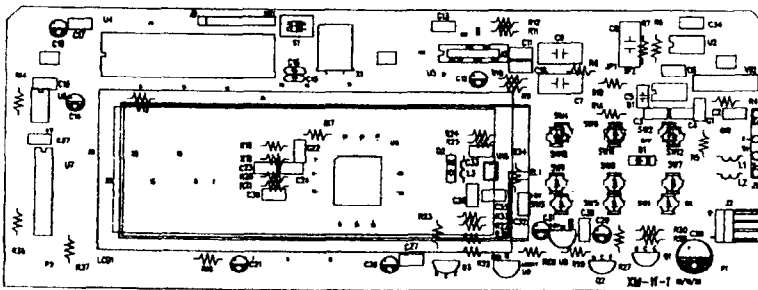
2. PCB LAYOUT



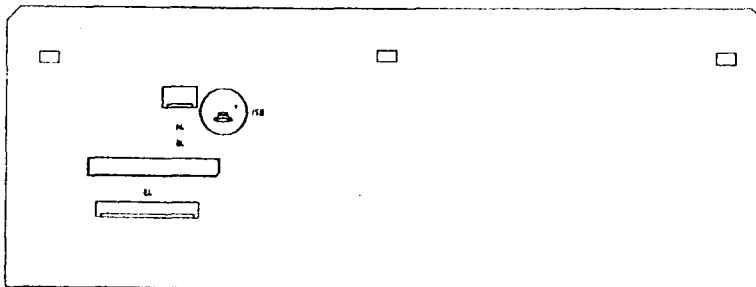
**XM-11-1
TOP LAYER**



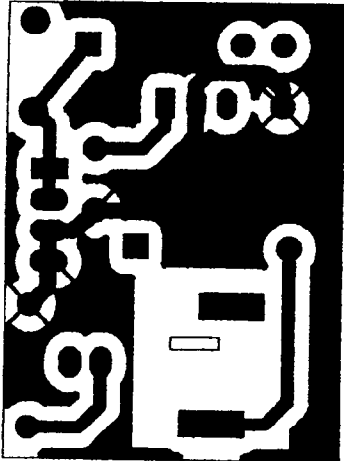
**XM-11-1
BOTTOM LAYER**



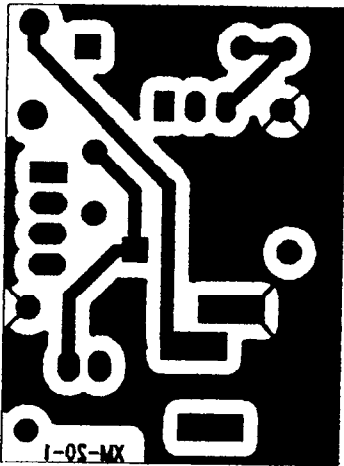
**XM-11-1
TOP OVERLAY**



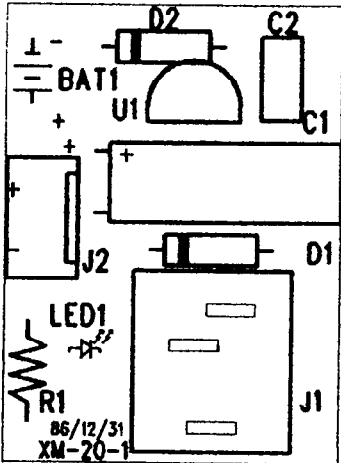
**XM-11-1
BOTTOM OVERLAY**



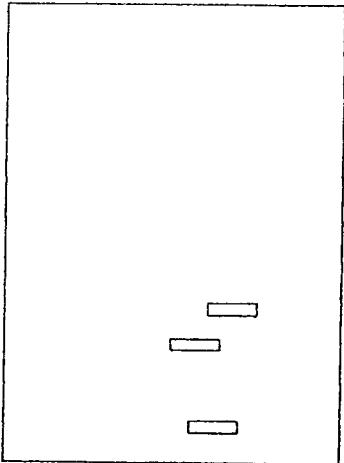
**XM-20-1
TOP LAYER**



**XM-20-1
BOTTOM LAYER**

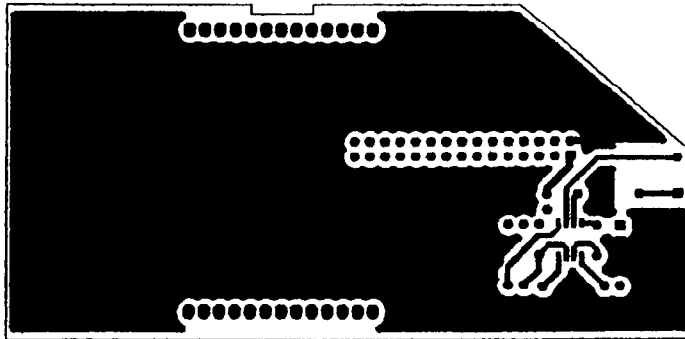


**XM-20-1
TOP OVERLAY**

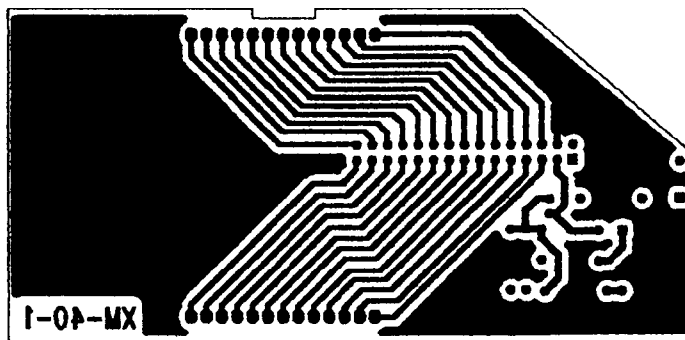


**XM-20-1
BOTTOM OVERLAY**

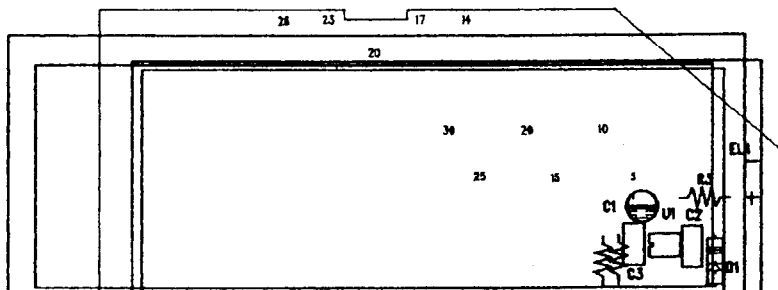
5. ELECTRICAL CIRCUITRY



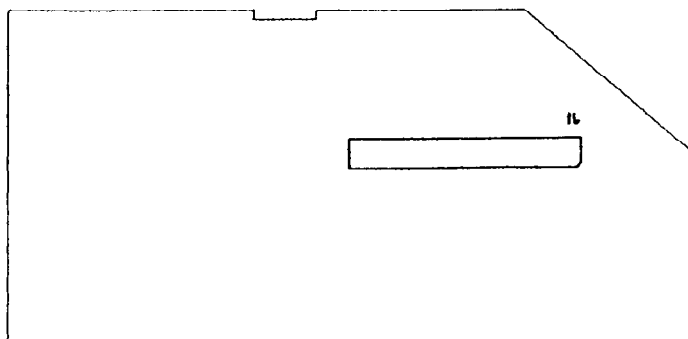
**XM-40-1
TOP LAYER**



**XM-40-1
BOTTOM LAYER**



**XM-40-1
TOP OVERLAY**



**XM-40-1
BOTTOM OVERLAY**

 XM SERIES PARTS LIST

STRUCTURE

Parts No.	Description	Specification	Qty	Remark
E9XM0000010	P.C.B.	XM MAINBOARD XM-11-X	1	
E9XM0001000	P.C.B.	XM REAR BOARD XM-40-X	1	OPTION
E1XM0020000	P.C.B.	POWER BOARD XM-20-X	1	
A00*****	LOAD CELL			
	FSU-F OR EQUIVALENT	CAPACITY = 1KG	1	XM-1000
	FSU-F OR EQUIVALENT	CAPACITY = 2KG	1	XM-2000
	FSU-F OR EQUIVALENT	CAPACITY = 5KG	1	XM-4000
	SS-22 OR EQUIVALENT	CAPACITY = 20KG	1	XM-10K
	SS-22 OR EQUIVALENT	CAPACITY = 30KG	1	XM-20K
G0001GSP100	UPPER CABINET	G SERIES (WHITE)	1	
G0001GSP000	UNDER CABINET	G SERIES (GRAY)	1	
F0003GSP102	ALUMINUM L/C SUPPORT(UPPER)	FSU L/C	1	
F0003GSP103	ALUMINUM L/C SUPPORT(UNDER)	FSU L/C	1	
G0002GSP000	PLASTIC PLATTER	G SERIES	1	
F0009000032	STAINLESS STEEL PLATE	220 X 185 X 0.5 mm	1	FOR PLATTER
G0007MFW000	BATTERY PACK	UM-1 X 4	1	
A5005000090	BUBBLE LEVEL	D14	1	OPTION
A60*****	ADAPTOR	***V/9V, 100 mA	1	
G0004MP0001	ADJUSTABLE FEET	M SERIES	4	
G0009EM0002	BATTERY CAP	EM SERIES	1	
G0004GSP000	RUBBER PAD	CFR-190603	4	FOR L/C SUPPORT
A1202040250	WIRE ARRAY(DOUBLE HOUSING)	4 PIN 25 cm	1	
C1GW0000000	PANEL PC	GW SERIES 135.5x45.5x0.8 mm	1	
C1XM*****	OVERLAY	XM SERIES	1	
COGM*****	REAR PANEL	G SERIES NO BUBBLE MARK	1	
COGM*****	REAR PANEL	G SERIES WITH BUBBLE MARK	1	OPTION
COGM*****	REAR PANEL	XM SERIES REAR DISPLAY	1	OPTION
F0008000005	ALUMINUM BLOCK	13 mm	1	FSU AND SS-22-20KG
A1203300340	FLAT CABLE	30 PIN 34 cm	1	
XM-20-X POWER BOARD				
E0XM*****	P.C.B.	XM POWER BOARD XM-20-X	1	
A0207078081	I.C.	78L08	1	U1
A0501004148	DIODE	1N4148	1	D2
A0501004002	DIODE	1N4002	1	D1
A0603050000	L.E.D.	ORANGE ROUND 5 mm	1	LED1
A0701108016	CAPACITOR (EC)	1000uF/16V	1	C1
A0730104050	CAPACITOR (MLC)	0.1u/50V (104)	1	C2
A0805040471	CARBON FILM RESISTOR	470 OHM 1/4W	1	R1
A0901010040	CONNECTOR (WIRE ARRAY)	4 PIN WAFER	1	J2
A0906000220	D.C. JACK	SCD-022 (BLACK)	1	J1

6. PARTS LIST

XM-11-X MAINBOARD

E0XM1000010	P.C.B.	XM-11-X	1	
A0208072250	I.C.	UPD7225G	1	U6
A0203077150	I.C.	AD7715	1	U3
A0206000071	I.C.	OP-07CP	1	U1
A0206000071	I.C.	OP-07CP	1	U2 (OPTION)
A0202093462	I.C.	93LC46	1	U5
A0207010301	VOLTAGE REGULATOR I.C.	HT1030 OR AIC-1722-33CZT	1	U8
A0250070390	I.C.	HT7039	1	U9
A0300000040	I.C. SOCKET	40 PIN	1	U4
A0401009450	TRANSISTOR	2SC945	1	Q2
A0401007330	TRANSISTOR	A733	1	Q1
A0501004148	DIODE	1N4148	1	D1
A0701227017	CAPACITOR (EC)	220uF/16V (SS TYPE)	1	C28
A0701106017	CAPACITOR (EC)	10uF/16V (SS TYPE)	7	C12,C14,C18, C21,C26,C29, C31
A0730104050	CAPACITOR (MLC)	104Z	17	C1~4,C6, C10~11,C13, C17,C19,C22 C23~24,C27, C30,C32,C36 C9
A0710474101	POLYESTER FILM CAPACITOR (MEF)	0.47uF/100V (474)	1	C9
A0710474101	POLYESTER FILM CAPACITOR (MEF)	0.47uF/100V (474)	2	C7~8 OPTION
A0720103101	POLYESTER FILM CAPACITOR (PE1)	0.01uF/100V (103J)	1	C5
A0740020050	CERAMIC CAPACITOR (CC)	20pF	2	C15~16
A0804042502	METAL FILM RESISTOR	25K OHM 1/4W	2	R9, R11
A0804044701	METAL FILM RESISTOR	4.7K OHM 1/4W	2	R8, R12
A0804041003	METAL FILM RESISTOR	100K OHM 1/4W	2	R4~5
A0804041003	METAL FILM RESISTOR	100K OHM 1/4W	2	R6~7 OPTION
A0804042002	METAL FILM RESISTOR	20K OHM 1/4W	1	R10
A0804042322	METAL FILM RESISTOR	23.2K OHM 1/4W	1	R32 OPTION
A0805041103	CARBON FILM RESISTOR	10K OHM 1/4W	8	R13,R18~20, R26~27, R30~31
A0805041104	CARBON FILM RESISTOR	100K OHM 1/4W	1	R33
A0805041102	CARBON FILM RESISTOR	1K OHM 1/4W	1	R14
A0805041331	CARBON FILM RESISTOR	330K OHM 1/4W	1	R17
A0805041101	CARBON FILM RESISTOR	100 OHM 1/4W	1	R21 OPTION
A0805041472	CARBON FILE RESISTOR	4.7K OHM 1/4W	1	R16
A0805041223	CARBON FILE RESISTOR	22K OHM 1/4W	2	R28~29
A1005030512	FERRITE BEAD	3.5 X 6 X 0.8mm	2	L1~2
A0802047309	RESISTOR NETWORK	47K OHM 9 PIN	1	NR1
A0801001203	TRIMMER	3006P-001-203 (20K)	1	VR1
A0910100130	SOCKET STRIPS	SIP 1 X 13 (FEMALE)	2	FOR LCD
A1301000002	DIP S/W	DS-02 (4 PIN)	1	S1 (OPTION)
A1100260000	CRYSTAL	6.0 MHz	1	X1
A1500000004	BUZZER	OBO-15210	1	BZ1
A1306000004	TACT SW	KA-130	4	SW1~4
A0901010040	CONNECTOR	4 PIN WAFER	1	J4 (RS-232 OPTION)
A0901011040	CONNECTOR	4 PIN WAFER 90°	1	J2
A0201089521	I.C.	89C52	1	U4
A0102000289	L.C.D.	G289	1	

6. PARTS LIST

XM-11-X MAINBOARD (EL & PRINTER OPTION)

EL OPTION:

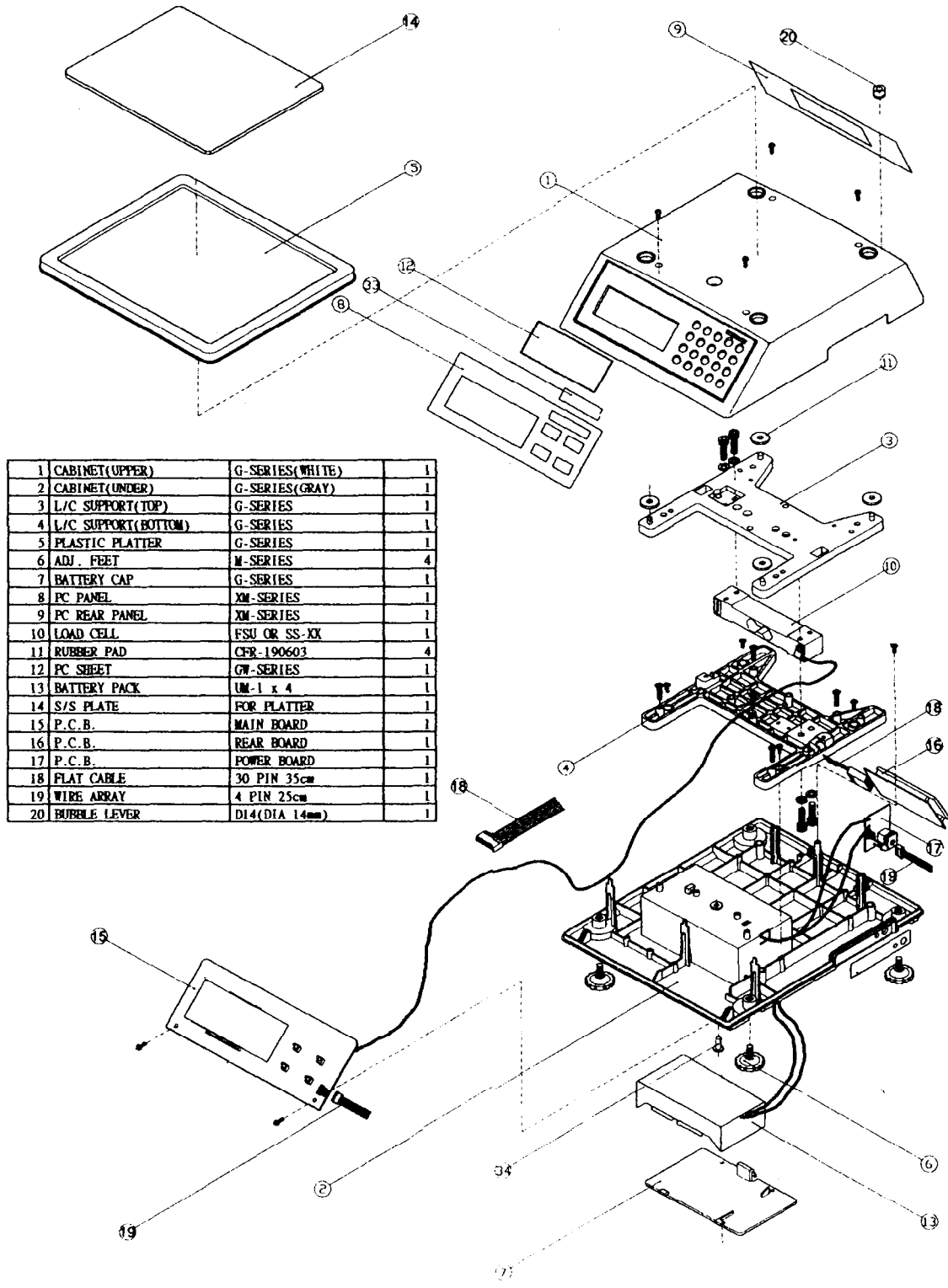
A0250008030	I.C.	HV803LG	1	U10
A1400000006	BACK LIGHT	EL-13044 (134 X 44 mm)	1	EL1
A0401033770	TRANSISTOR	C2001 OR C3377	1	Q3
A0501004148	DIODE	1N4148	1	D2
A0730104050	CAPACITOR (MLC)	104Z	2	C25, C33
A0740104100	CERAMIC CAPACITOR (CC)	0.1uF/100V (104)	1	C35
A1002108000	INDUCTOR	1mH	1	L3
A0805041472	CARBON FILM RESISTOR	4.7K OHM 1/4W	2	R22, R34
A0805041102	CARBON FILM RESISTOR	1K OHM 1/4W	1	R23
A0805041105	CARBON FILM RESISTOR	1M OHM 1/4W	1	R24
A0805041565	CARBON FILM RESISTOR	5.6M OHM 1/4W	1	R25
PRINTER OPTION:				
A0204743742	I.C.	74HC374	1	U7
A0805041104	CARBON FILM RESISTOR	100K OHM 1/4W	2	R36~37
A0901010120	CONNECTOR (WIRE ARRAY)	12 PIN WAFER	1	J3

XM-40-X REAR BOARD (OPTION)

EOXM*****	P.C.B.	XM-40-X	1	
A0102000289	L.C.D.	G289	1	
A0250008030	I.C.	HV803LG	1	U1 (EL OPTION)
A1400000006	BACK LIGHT	EL-13044 (134 X 44 mm)	1	EL1 (EL OPTION)
A0501004148	DIODE	1N4148	1	D1 (EL OPTION)
A0730104050	CAPACITOR (MLC)	104Z	1	C3 (EL OPTION)
A0740104100	CERAMIC CAPACITOR (CC)	0.1uF/100V (104)	1	C2 (EL OPTION)
A1002108000	INDUCTOR	1mH	1	L1 (EL OPTION)
A0804044701	METAL FILM RESISTOR	4.7K OHM 1/4W	1	R3 (EL OPTION)
A0805041105	CARBON FILM RESISTOR	1M OHM 1/4W	1	R1 (EL OPTION)
A0805041565	CARBON FILM RESISTOR	5.6M OHM 1/4W	1	R2 (EL OPTION)
A0910100130	SOCKET STRIPS	SIP 1 X 13 (FEMALE)	2	FOR LCD
A0907020300	CONNECTOR	2 X 15 PIN	2	

6. PARTS LIST

PARTS EXPLOSION:



1	CABINET(UPPER)	G-SERIES(WHITE)	1
2	CABINET(UNDER)	G-SERIES(GRAY)	1
3	L/C SUPPORT(TOP)	G-SERIES	1
4	L/C SUPPORT(BOTTOM)	G-SERIES	1
5	PLASTIC PLATTER	G-SERIES	1
6	ADJ. FEET	M-SERIES	4
7	BATTERY CAP	G-SERIES	1
8	PC PANEL	XM-SERIES	1
9	PC REAR PANEL	XM-SERIES	1
10	LOAD CELL	FSU OR SS-XR	1
11	RUBBER PAD	CFR-190603	4
12	PC SHEET	GW-SERIES	1
13	BATTERY PACK	UM-1 x 4	1
14	S/S PLATE	FOR PLATTER	1
15	P.C.B.	MAIN BOARD	1
16	P.C.B.	REAR BOARD	1
17	P.C.B.	POWER BOARD	1
18	FLAT CABLE	30 PIN 35cm	1
19	WIRE ARRAY	4 PIN 25cm	1
20	BUBBLE LEVER	D14(DIA 14mm)	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

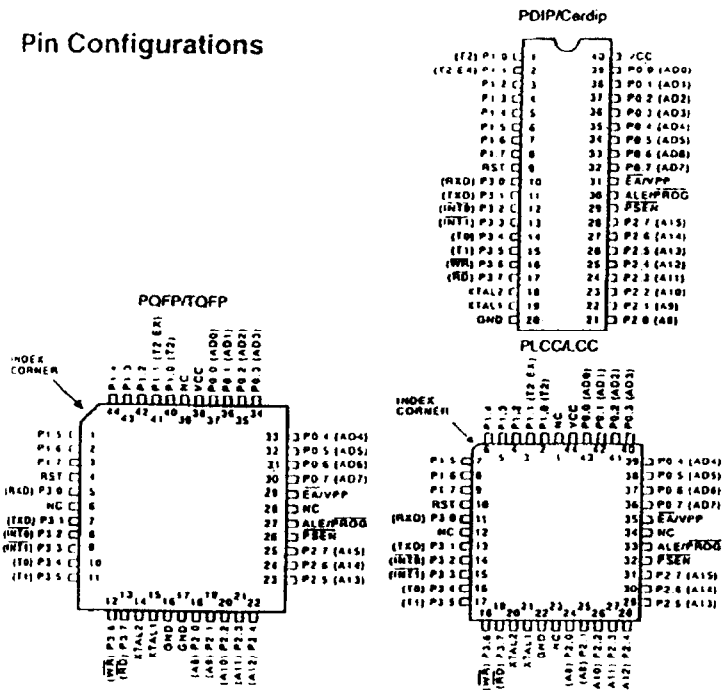
The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8 Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high density nonvolatile memory technology and is compatible with the industry standard 80C51 and 80C52 instruction 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

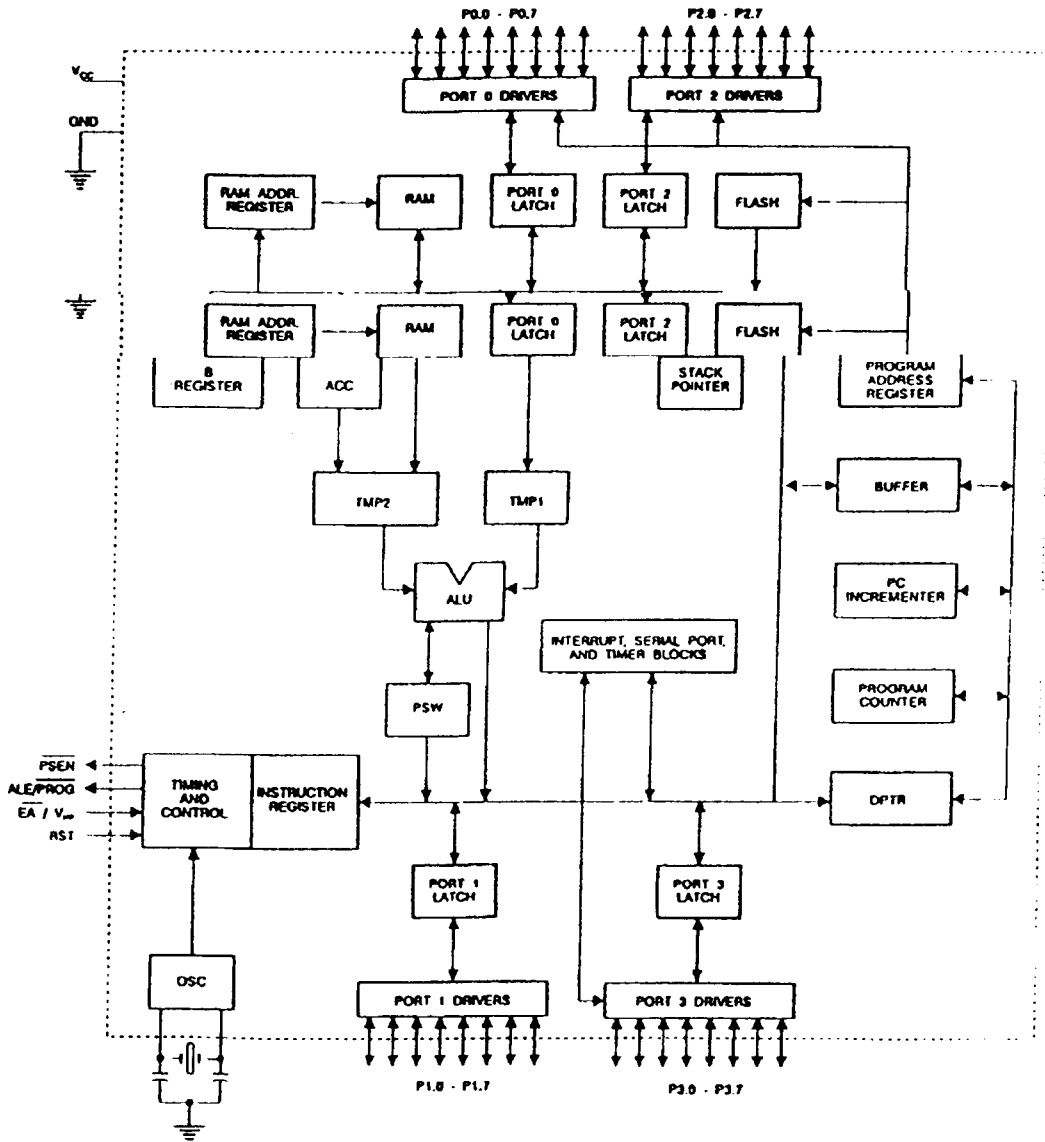


01114E

3-65



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

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.

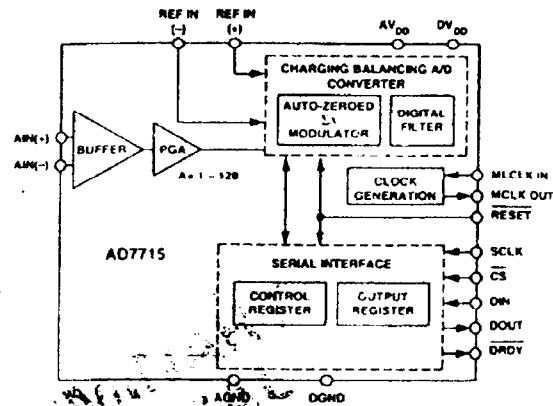
CMOS construction ensures very low power dissipation and the power-down mode reduces the standby power consumption to 50 μ W typ. The part is available in a 16-pin, 0.3 inch-wide, plastic and hermetic dual-in-line package (DIP) as well as a 16-lead small outline (SOIC) package.

*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.

FUNCTIONAL BLOCK DIAGRAM



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

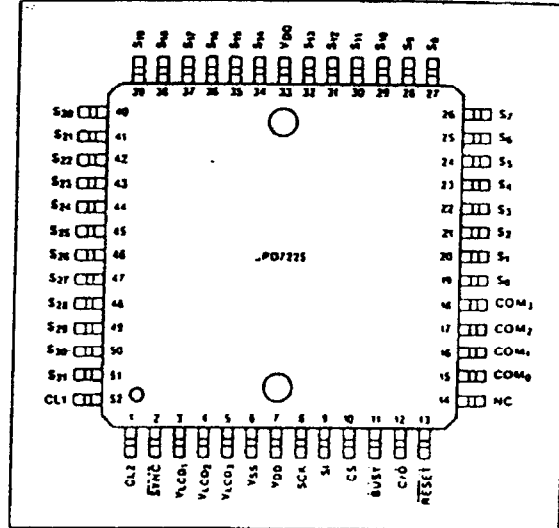
Description

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, biphexed, triplexed, 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

Pin Configuration

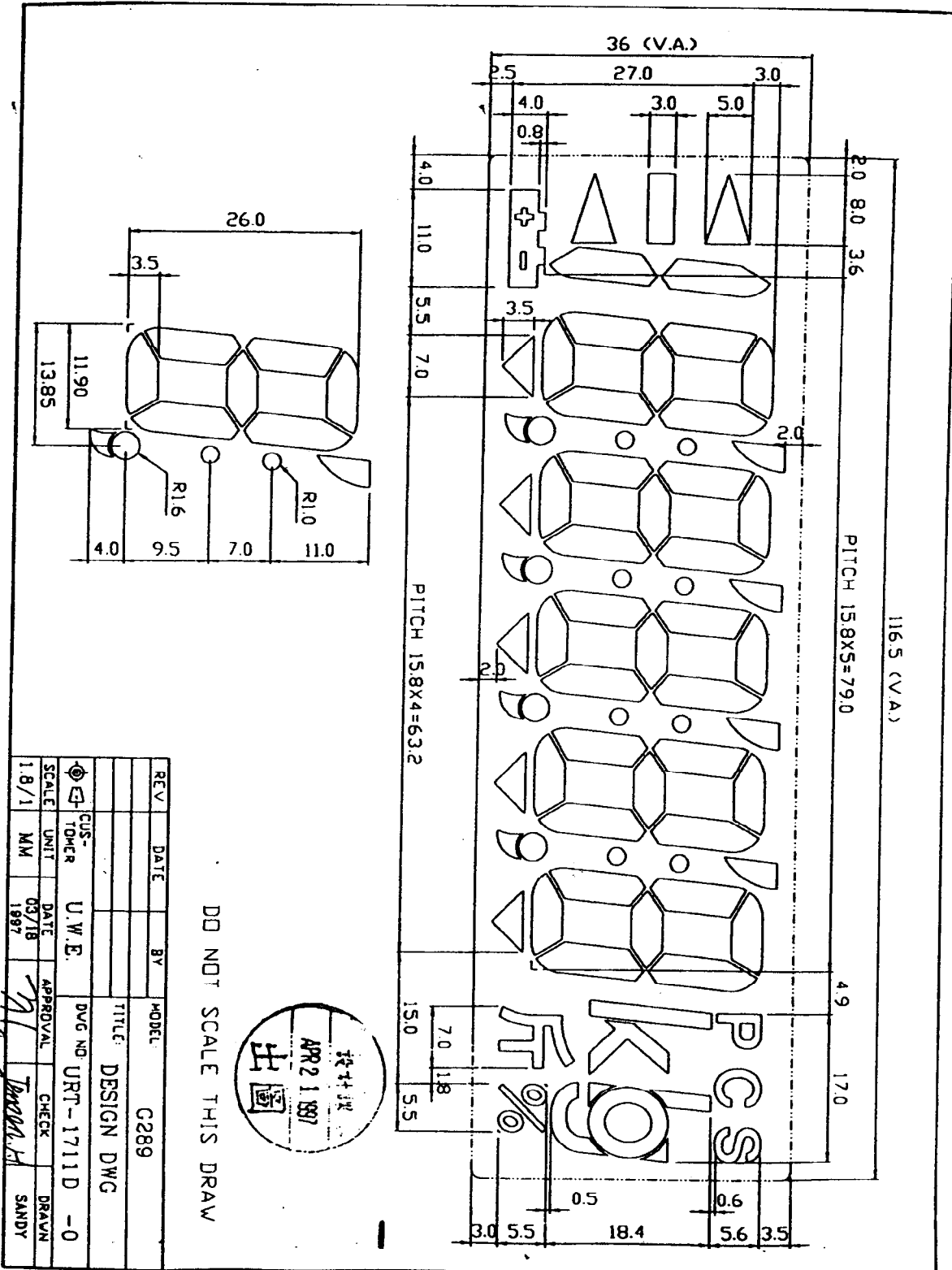


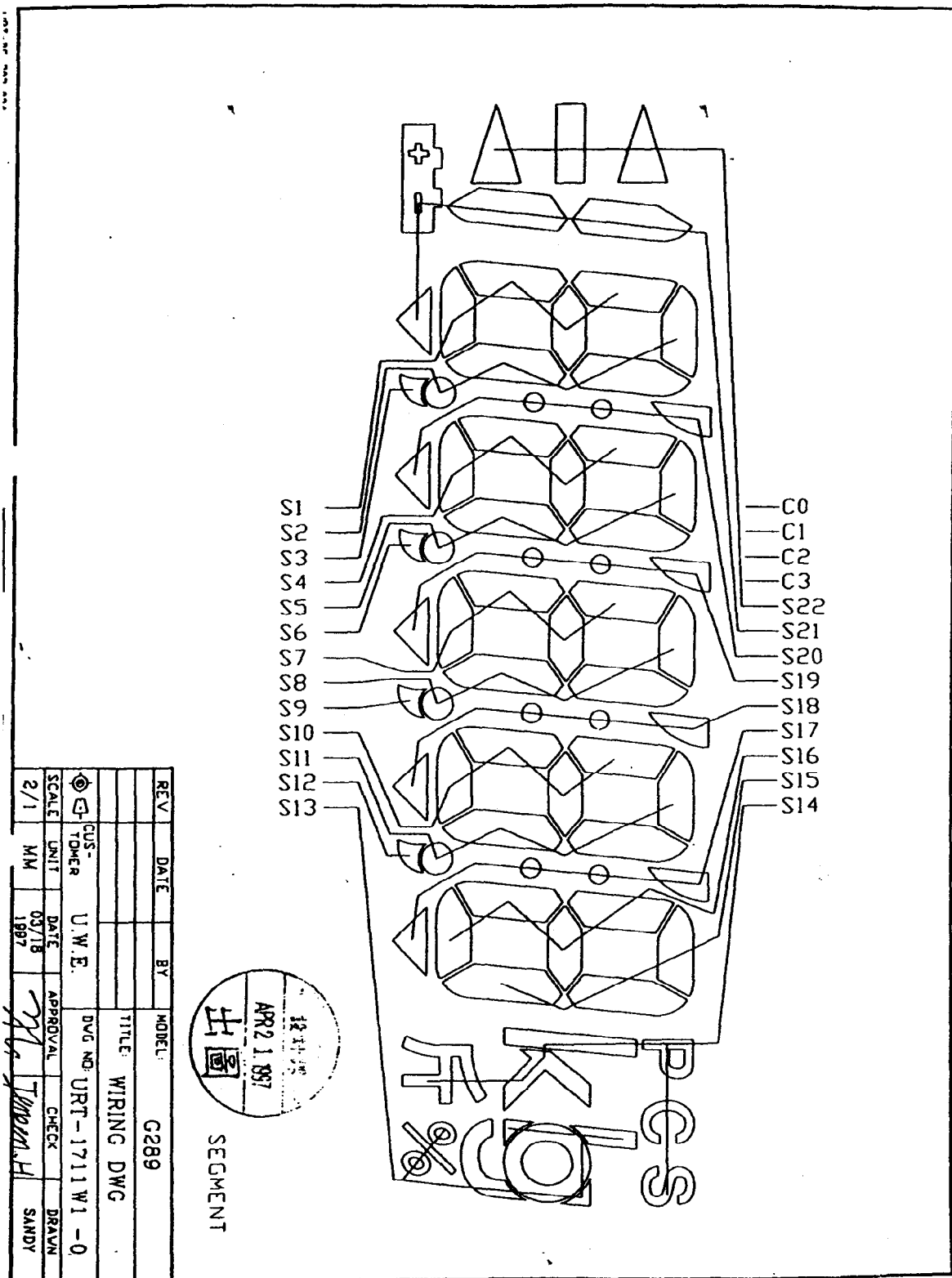
Pin Identification

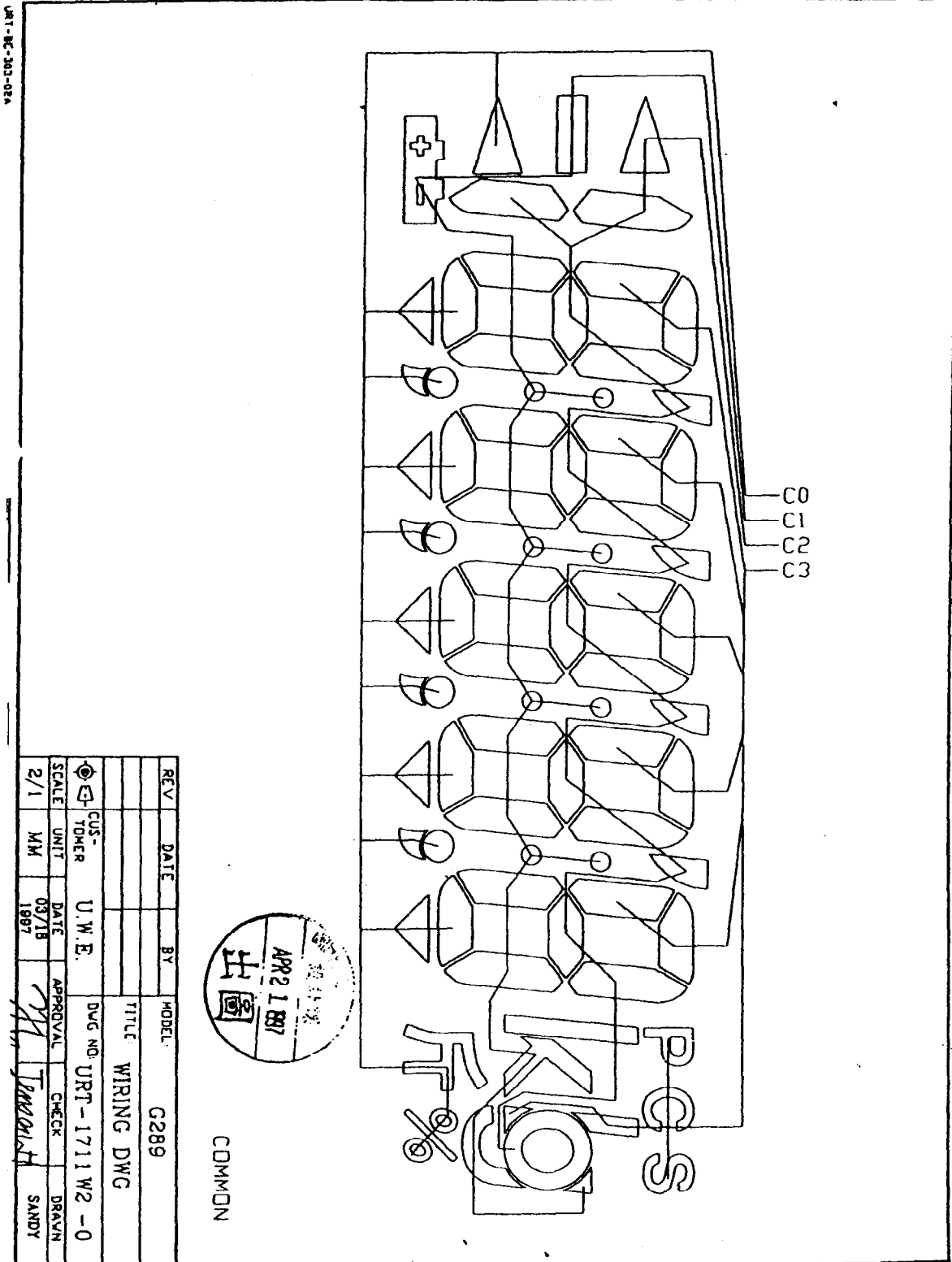
No.	Symbol	Function
1	CL2	System clock output
2	SYNC	Synchronization port
3-5	V _{LC01} V _{LC02} V _{LC03}	LCD bias voltage supply inputs
6	V _{SS}	Ground
7, 33	V _{DD}	Power
8	SCK	Serial clock input
9	SI	Serial input
10	CS	Chip select
11	BUSY	Busy output
12	C/D	Command or data select input
13	RESET	Reset input
14	NC	No connection
15-18	COM ₀ -COM ₃	LCD backplane driver outputs
19-32, 34-51	S ₀ -S ₃₁	LCD segment driver outputs
52	CL1	System clock input

Ordering Information

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



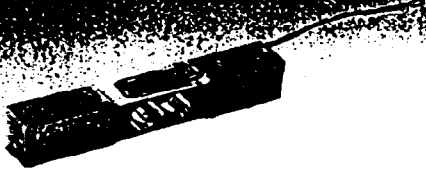
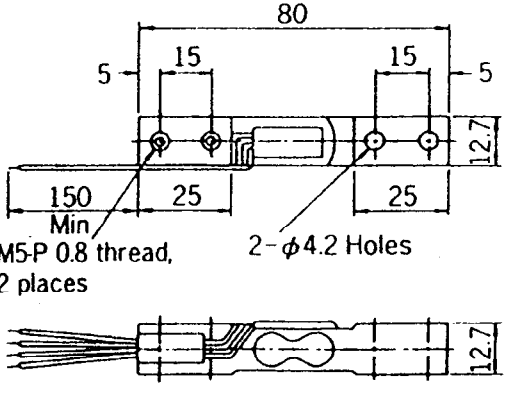




REV	DATE	BY	MODEL	G289
			TITLE	WIRING DWG
			DWG NO.	URT-1711 W2 -0
			CHECK	
			DRAWN	SANDY
			APPROVAL	<i>[Signature]</i>
			DATE	03/18 1997
			UNIT	MM
			SCALE	2/1
			CUSTOMER	U.M.E.
			UNIT	MM

URT-EC-202-02A

FSU LOAD CELL SPECIFICATION SHEET

Type	FSU
	
<p>Rated capacity</p> <p>Rated output</p> <p>Non-linearity</p> <p>Hysteresis</p> <p>Repeatability</p> <p>Temp. range compensated</p>	<p>0.5, 1, 2, 5kg</p> <p>0.5mV/V</p> <p>0.5%R.O.</p> <p>0.3%R.O.</p> <p>0~60℃</p>
Outlines	
	 <p>M5-P 0.8 thread, 2 places</p> <p>2-ϕ4.2 Holes</p>