

CONTENTS

	Page
Section 1 General Description	
1-1 Introduction	1.1
1-2 Name of Panels, Controls, etc	1.2
1-3 Composition	1.4
1-3-1 Main Unit	1.4
TEC-7100 series.....	1.4
TEC-7200 series.....	1.5
TEC-7300 series.....	1.6
1-3-2 Optional Units	1.7
TEC-7100 series.....	1.7
TEC-7200 series.....	1.8
TEC-7300 series.....	1.9
1-3-3 System Component Table	1.10
TEC-7100 series.....	1.10
TEC-7200 series.....	1.11
TEC-7300 series.....	1.12
1-4 Internal Switch Setting (ECG/CPU board)	1.13
 Section 2 Specifications	
Defibrillation Section	2.1
ECG Amplifier Section	2.3
Monitor Section	2.4
Recorder Section	2.5
Battery	2.6
External Paddle	2.7
General	2.8
 Section 3 Theory of Operation	
3-1 System Overview	3.1
3-2 Block Diagrams	3.3
System Block Diagram	3.3
Detailed Block Diagram	3.4
3-3 ECG/CPU Board UP-7635/76351/7737	3.7
3-3-1 ECG Amplifier	3.7
ECG Input and Lead Selection	3.7
Leads-off Detection	3.9
ECG Isolation	3.10
Paddle Lead ECG Input	3.12
Paddle Lead ECG Isolation	3.13
Paddle Contact Impedance Detection (TEC-7200/7300)	3.15
Test Waveform Generator	3.16
Input Selector	3.17

CONTENTS

Baseline Restorer, Time Constant and INST Control	3.18
External Inputs	3.20
AC Filter	3.21
Sensitivity Selection	3.22
ECG Analog Output	3.23
External Outputs	3.24
3-3-2 ECG CPU	3.25
Outline	3.25
Communication with the Host CPU	3.27
Processing Cycle	3.28
ECG CPU Pin Description	3.29
3-3-3 HOST CPU (Main Section with UP-7638 Front Panel Board)	3.31
Outline	3.31
Host CPU	3.32
Host CPU Pin Description	3.32
I/O Port Pin Description	3.34
Key Entry (UP-7638)	3.36
Energy Selection	3.38
LED Display (UP-7638)	3.38
Sound Control	3.42
Power-on Reset	3.46
Runaway Detection	3.47
Real-time Clock	3.48
Data Transfer to Recorder	3.49
3-3-4 CRT CPU	3.51
Outline	3.51
Communication with the Host CPU	3.51
One-frame Display Cycle	3.53
Character Data Transfer to CRT Driver	3.54
Waveform Data Transfer to CRT Driver	3.58
Peak-bottom Processing	3.59
CRT CPU Pin Description	3.60
3-4 CRT Driver UP-7740	3.62
Outline	3.62
Horizontal Deflection Driver	3.63
Vertical Deflection Driver	3.65
Vertical Position Control	3.67
Blanking	3.68
QRS Sync Spot	3.68
3-5 High Voltage Board UP-7636/7851	3.69
Outline	3.69
Switching Control	3.69
Charge Energy Monitor	3.71
Internal Discharge	3.71

	External Discharge	3.72
	TTR Detection (Not used in TEC-7100)	3.73
	Discharge Test Detection	3.74
3-6	Motor Drive Control UP-7738	3.75
	Outline	3.75
	Rotation Sensor	3.76
	Phase Locked Loop	3.76
	Integrator	3.77
	Start / Stop Control	3.77
	Paper Feed Control	3.77
	Running Out of Paper	3.78
	Power Supply	3.78
3-7	Power Unit SC-701V	3.79
	Outline	3.79
	AC Power Supply	3.79
	AC/DC Switching Control	3.80
	Relay Control	3.80
	DC/DC Switching Control	3.81
	Battery Charger	3.82
	Battery Charge Indication	3.83
 Section 4 Self-check		
4-1	Introduction	4.1
4-2	Error 1	4.2
4-3	Error 2, 3	4.3
4-4	Error 4	4.4
 Section 5 Adjustments		
5-1	ECG / CPU Board UP-7635/76351/7737	5.1
	5-1-1 Charging Completion Sound	5.1
	5-1-2 Reference Voltage	5.2
	5-1-3 ECG Amplifier Gain	5.2
	5-1-4 Amplitude of Calibration Waveform	5.3
	5-1-5 Amplitude of Test Signal	5.3
	5-1-6 Paddle Contact Indicator	5.3
	5-1-7 Battery Level Indicaator	5.3
5-2	Switching Regulator UP-7640/7720	5.4
	5-2-1 Power Supply Voltage + 12VB	5.5
	5-2-2 Power Supply Voltage + 5V	5.6
	5-2-3 + 5V Current Limter	5.6
	5-2-4 Trickle Charging Voltage	5.7
	5-2-5 Maximum Charging Current	5.8
	5-2-6 Current Change from Cycle Charge to Trickle Charge	5.9

CONTENTS

5-3	High Voltage Board UP-7636/7851	5.10
5-3-1	Delivered Energy	5.10
5-3-2	Energy Charging Time	5.12
5-3-3	TTR Gain Adjustment (TEC-7200/7300)	5.12
5-3-4	Delivered Energy Display (TEC-7200/7300)	5.13
5-4	CRT Display UP-7740	5.14
5-4-1	Pattern Distortion and Sweep Rotation	5.14
5-4-2	Waveform and Character Position	5.15
5-4-3	Sub Intensity	5.16
5-4-4	Focus	5.16
5-5	Motor Control Board UP-7738	5.17
5-5-1	Motor Rotation	5.17
5-5-2	Thermal Head Supply Voltage	5.18
5-6	Thermal Head Replacement & Alignment	5.19
5-6-1	Thermal Head Replacement	5.19
5-6-2	Thermal Head Alignment	5.19

Section 6 Disassembly

6-1	Upper Casing (Location of Units)	6.1
6-2	Recorder WS-701V	6.2
6-2-1	Speaker Unit	6.2
6-2-2	Thermal Head	6.3
6-2-3	Motor	6.3
6-2-4	Timing Belt	6.3
6-2-5	Photosensor	6.4
6-2-6	Platen	6.4
6-3	High Voltage Section	6.5
6-3-1	Energy Capacitor, Coil and External Discharge Relay	6.5
6-3-2	High Voltage Board UP-7636/7851	6.5
6-3-3	Internal Discharge Relay	6.5
6-4	Front Panel Assembly	6.6
6-4-1	CRT	6.6
6-4-2	Front Panel Board UP-7638	6.6
6-5	Paddle / Paddle Connector Receptacle	6.7
6-5-1	Paddle ND-701V (TEC-7100)	6.7
6-5-2	Paddle Connector Receptacle (TEC-7200/7300)	6.7
6-6	Lower Casing	6.8
6-7	Power Unit SC-701V (SW Regulator Board UP-7640/7720)	6.9
6-8	ECG / CPU Board UP-7635/76351/7637	6.9
6-9	VR and Connector Board UP-7639 & ECG Input Connector	6.10

Section 7 Mechanical Parts List

Section 8 Electrical Parts List

Section 9 IC Data

Section 10 Signal List

Section 11 Circuit Diagrams and Parts Locations

1-1 Introduction

This manual contains service information pertaining to the CARDIOLIFE model TEC-7000 series defibrillator. Information concerning optional units such as transmitters, receivers, interface units, and pacing units is not included. See pages 1.10 to 1.12 for the models of TEC-7000 series. The operation and performance of all these models are the same unless otherwise specified. Also refer to the operator's manual to become familiarized with the equipment.

The CARDIOLIFE TEC-7000 series is a lightweight, compact system with an integrated recorder, dual-trace 5.5-inch CRT, AC power unit and battery charger. The TEC-7000 series is designed for simple operation during a cardiac emergency with only two steps required before energy discharge and a one-step energy level adjustment.

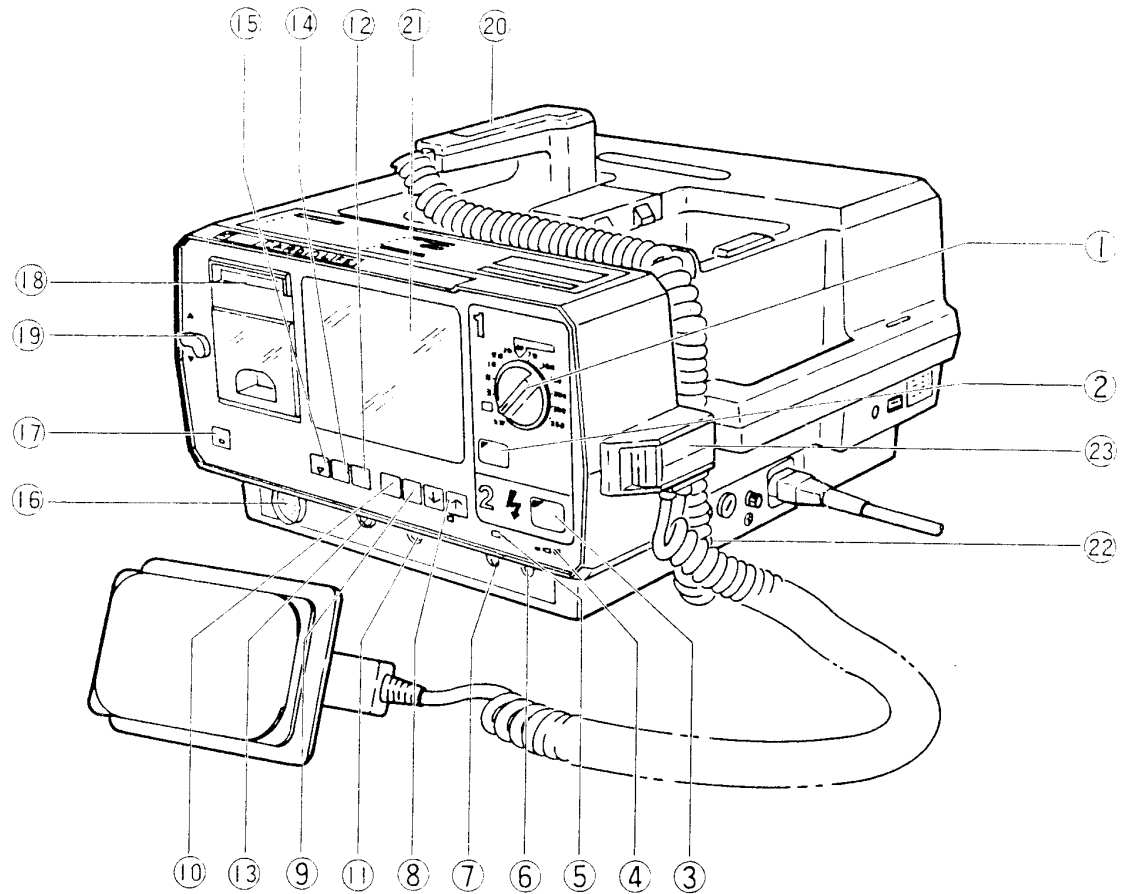
Special care must be taken for the power unit and high voltage board/block as these units have a dangerously high voltage level.

Difference among TEC-7000 series

Function	TEC-7100	TEC-7200	TEC-7300
Internal paddle	No	Yes	Yes
Paddle contact indicator	No	Yes	Yes
Delivered energy printing	No	Yes	Yes
Transthoracic resistance printing	No	Yes	Yes
Interface unit connection	No	No	Yes
Pacing unit connection	No	No	Yes
Slow paper speed (5mm/s)	No	No	Yes
VPC detection	No	No	Yes
Trendgraph	No	No	Yes

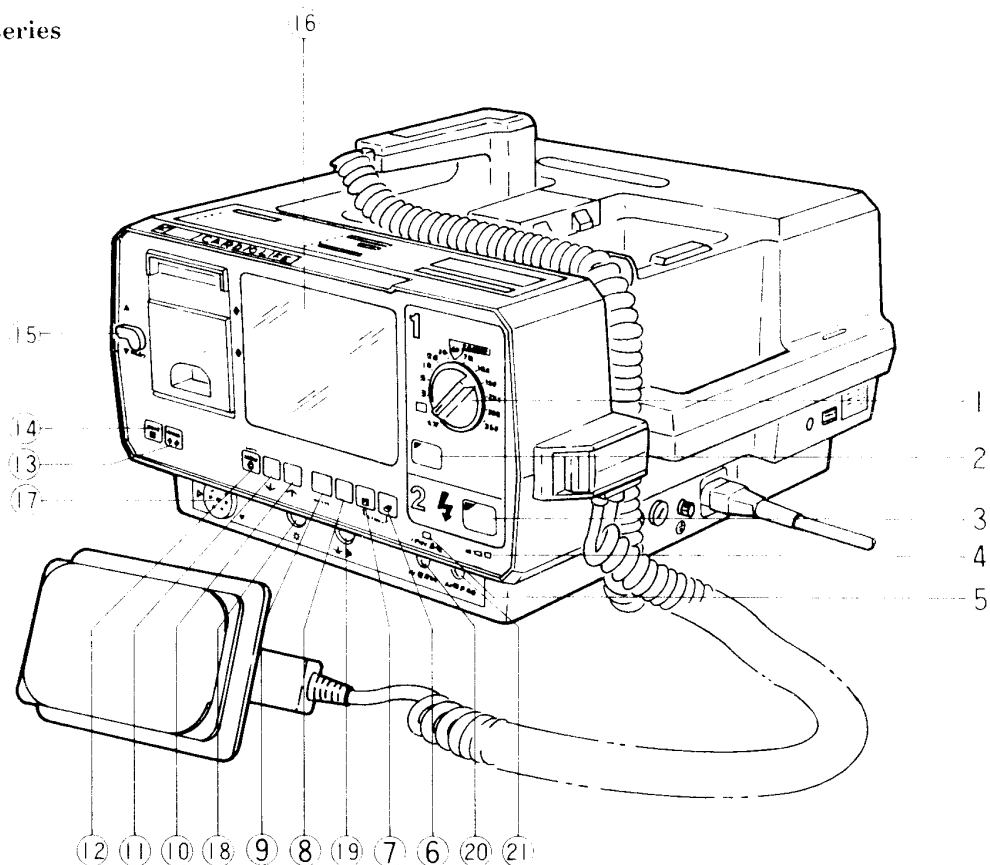
1-2 Name of Panels, Controls, etc

TEC-7100/7200 series



- | | | | |
|----|---|----|----------------------------------|
| 1 | Output energy select dial | 13 | Intensity control knob |
| 2 | Synchronization mode select key | 14 | Lead select key |
| 3 | Energy charge key | 15 | Freeze key |
| 4 | Battery level indicator | 16 | ECG input connector |
| 5 | Battery charge indicator | 17 | Record / stop key |
| 6 | ECG output terminal | 18 | Recorder |
| 7 | External ECG input terminal | 19 | Head release / paper feed lever |
| 8 | High / low select key / calibration key | 20 | Paddle |
| 9 | High / low limit set | 21 | Monitor |
| 10 | Alarm ON / OFF key | 22 | AC power switch |
| 11 | QRS sound volume control knob | 23 | Paddle connector (TEC-7200 only) |
| 12 | Sensitivity select key | | |

TEC-7300 series

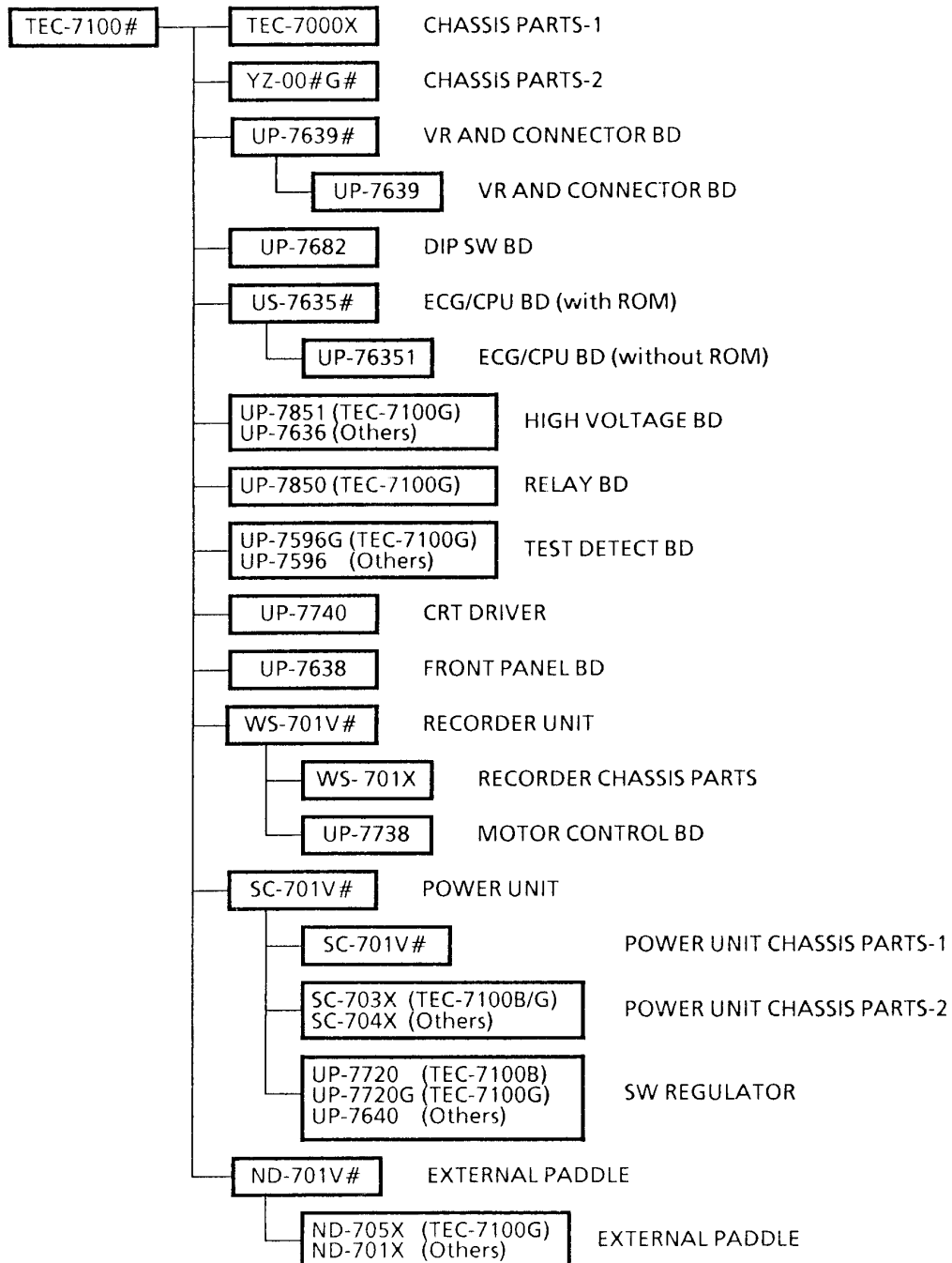


- | | |
|---|--|
| 1 Output energy selection dial | 11 Lead select key
Decrease key
RECALL wave select key |
| 2 Synchronization mode select key | 12 Freeze key |
| 3 Energy charge key | 13 Record select key |
| 4 Battery level indicator | 14 Record/stop key |
| 5 Battery charge indicator | 15 Head release/paper feed lever |
| 6 Display mode select key | 16 Monitor |
| 7 Calibration key | 17 ECG input connector |
| 8 Alarm on/off select key | 18 Intensity control knob |
| 9 Alarm set key | 19 QRS sound volume control knob |
| 10 Sensitivity select key
Increase key | 20 External input terminal |
| | 21 External output terminal |

1-3 Composition

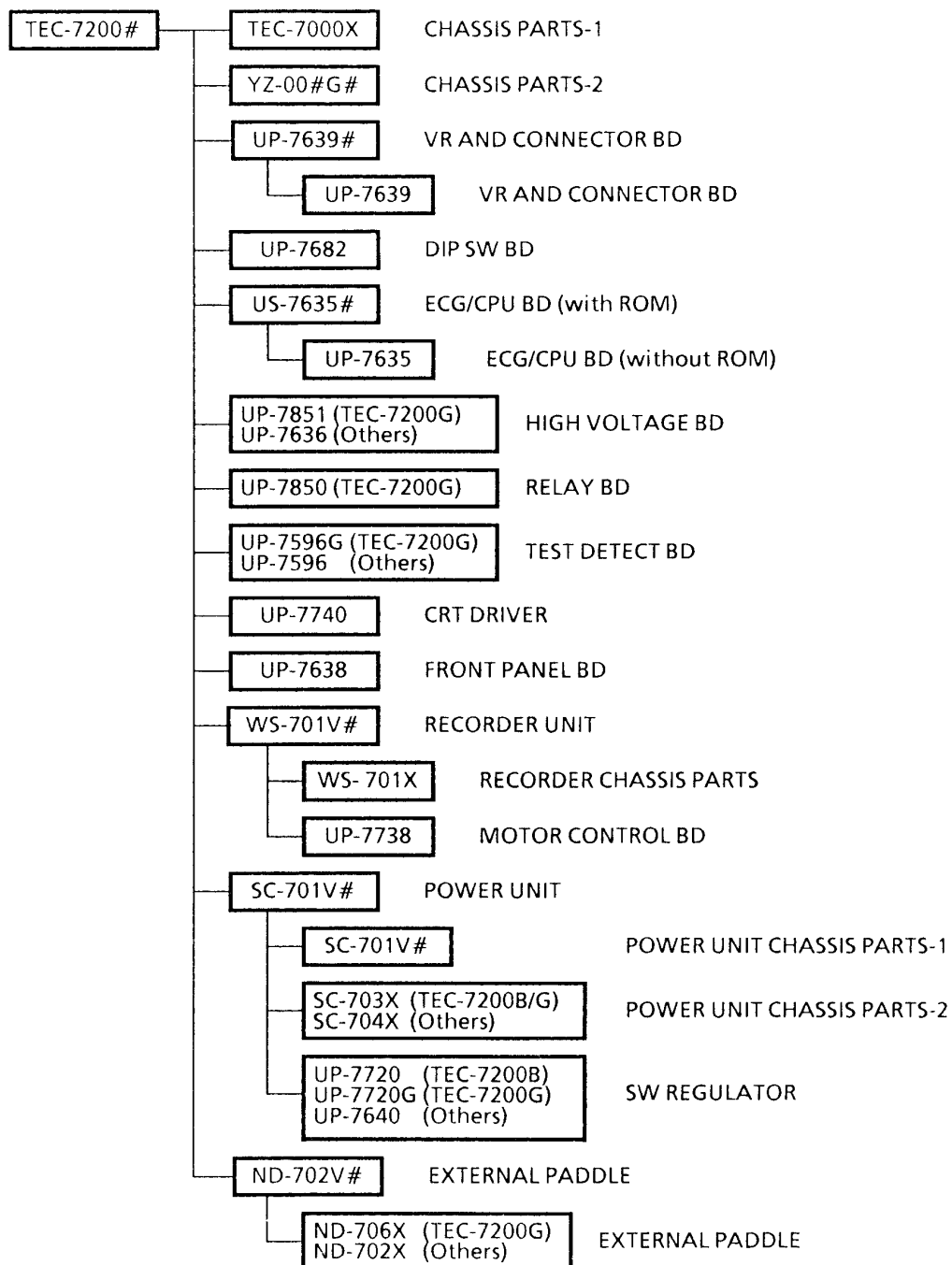
1-3-1 Main Unit

TEC-7100 series



Units with # mark differ according to the model.
See page 1.10 for units with # mark.

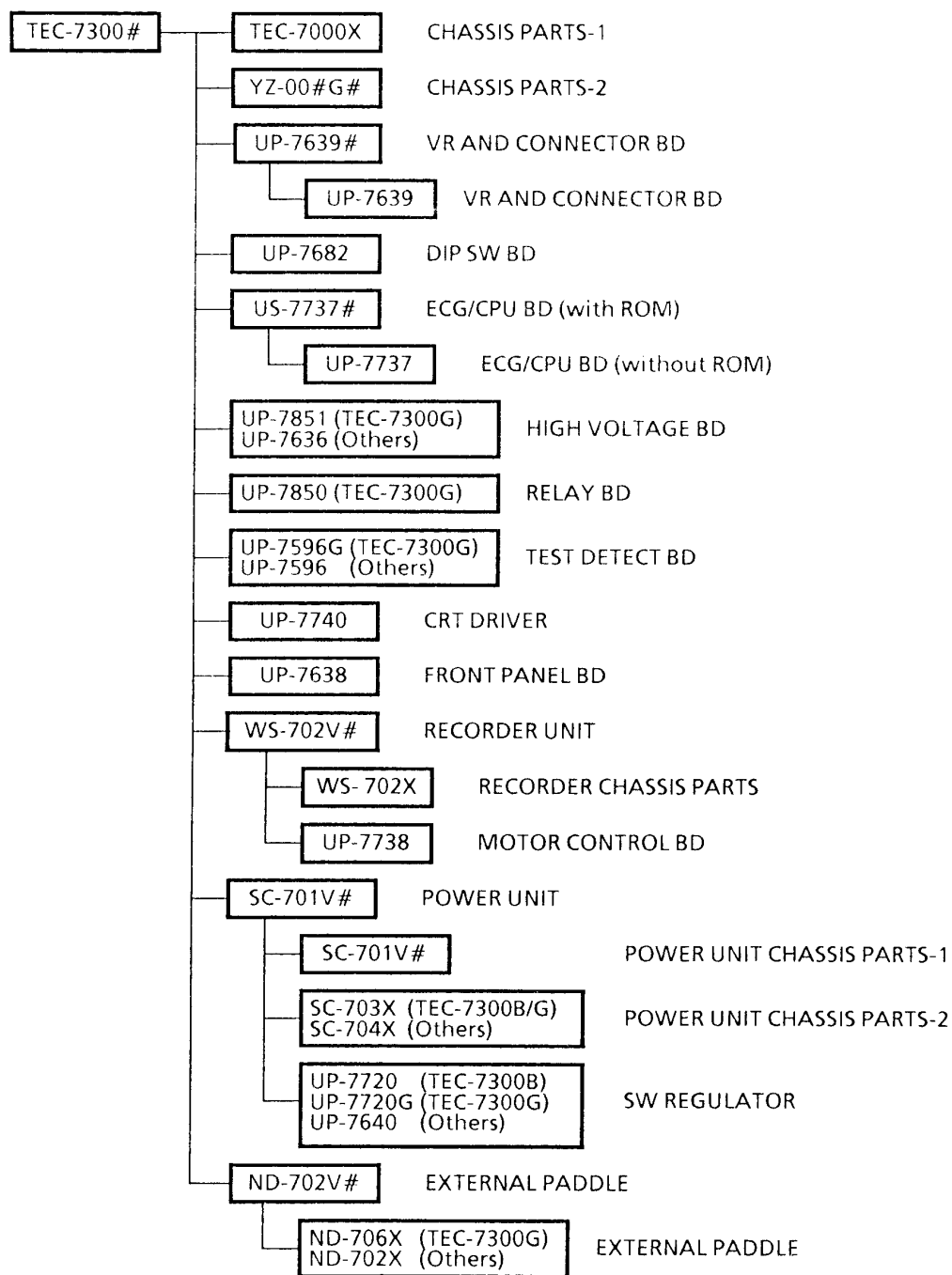
TEC-7200 series



Units with # mark differ according to the model.
See page 1.11 for units with # mark.

1. GENERAL DESCRIPTION

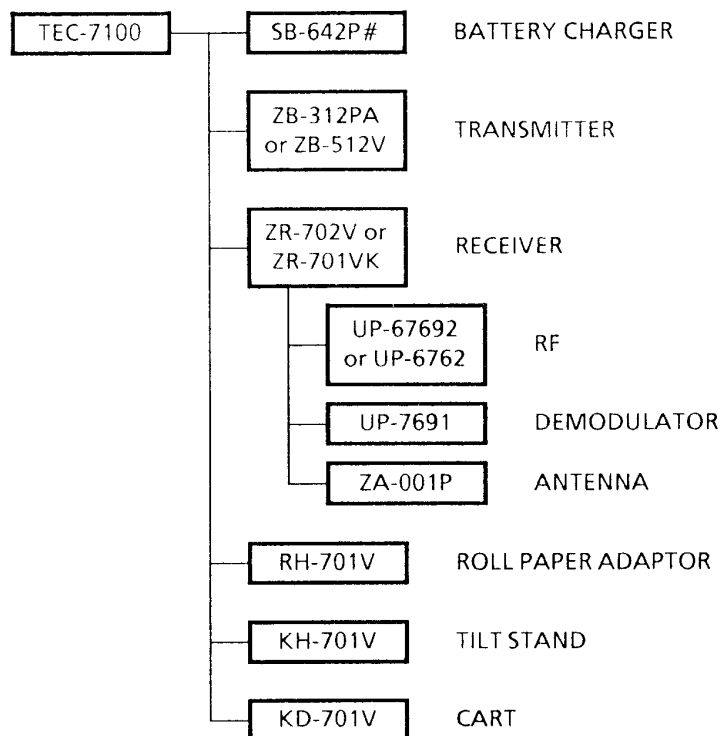
TEC-7300 series



Units with # mark differ according to the model.
See page 1.12 for units with # mark.

1-3-2 Optional Units

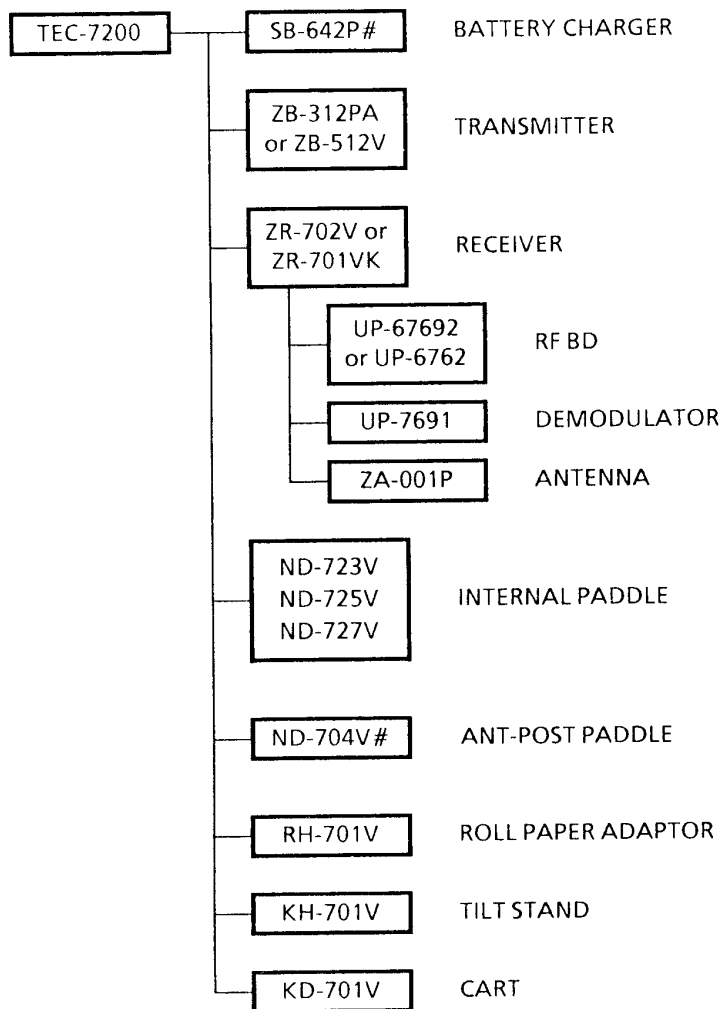
TEC-7100 series



Units with # mark differ according to the model.
See page 1.10 for units with # mark.

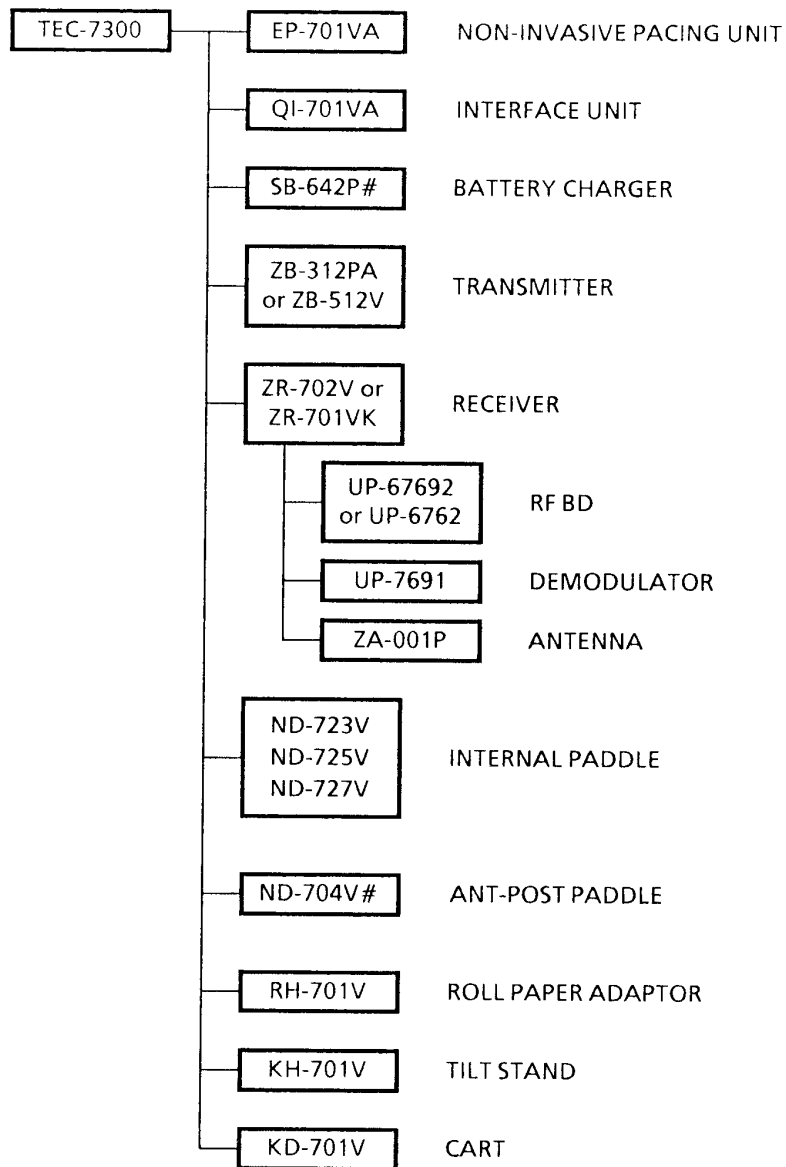
1. GENERAL DESCRIPTION

TEC-7200 series



Units with # mark differ according to the model.
See page 1.11 for units with # mark.

TEC-7300 series



Units with # mark differ according to the model.
See page 1.12 for units with # mark.

1. GENERAL DESCRIPTION

1-3-3 System Component Table

TEC-7100 series

	TEC-7100A	TEC-7100B	TEC-7100C	TEC-7100E	TEC-7100F	TEC-7100G	TEC-7100H	TEC-7100J	TEC-7100K	TEC-7100R
AC Line Voltage	117V	240V	220V	220V	220V	220V	220V	100-110-117V	220-240V	220V
AC Line Frequency	60Hz	50Hz	50Hz	50Hz	50Hz	50Hz	50Hz	50-60Hz	50-60Hz	50Hz
Chassis parts	YZ-000G8	YZ-000G9	YZ-001G0	YZ-001G6	YZ-001G1	YZ-001G2	YZ-001G8	YZ-001G4	YZ-001G5	YZ-001G3
External paddle	ND-701V	ND-701V	ND-701V	ND-701VE	ND-701VF	ND-701VG	ND-701VH	ND-701V	ND-701V	ND-701VR
Power unit	SC-701VA	SC-701VB	SC-701VC	SC-701VE	SC-701VF	SC-701VG	SC-701VH	SC-701VJ	SC-701VK	SC-701VR
Recorder unit	WS-701VA	WS-701VA	WS-701VC	WS-701VE	WS-701VF	WS-701VG	WS-701VH	WS-701VA	WS-701VA	WS-701VR
VR and connector BD	UP-76391	UP-76392	UP-76392	UP-76397	UP-76395	UP-76393	UP-76398	UP-76392	UP-76392	UP-76396
ECG/CPU BD with ROM	US-76353	US-76355	US-76355	US-76359	US-7635A	US-76357	US-7635K	US-76355	US-76355	US-7635B
High voltage BD	UP-7636	UP-7636	UP-7636	UP-7636	UP-7636	UP-7851	UP-7636	UP-7636	UP-7636	UP-7636
Relay BD	-----	-----	-----	-----	-----	UP-7850	-----	-----	-----	-----
Test detect BD	UP-7596	UP-7596	UP-7596	UP-7596	UP-7596	UP-7596G	UP-7596	UP-7596	UP-7596	UP-7596
Transmitter	ZB-312PA	-----	ZB-512V	-----	-----	-----	-----	ZB-512V	ZB-512V	-----
Receiver	ZR-702V	-----	ZR-701VK	-----	-----	-----	-----	ZR-701VK	ZR-701VK	-----
Battery charger	SB-642PA	SB-642PK	SB-642PK	-----	-----	-----	-----	SB-642PK	SB-642PK	-----

TEC-7200 Series

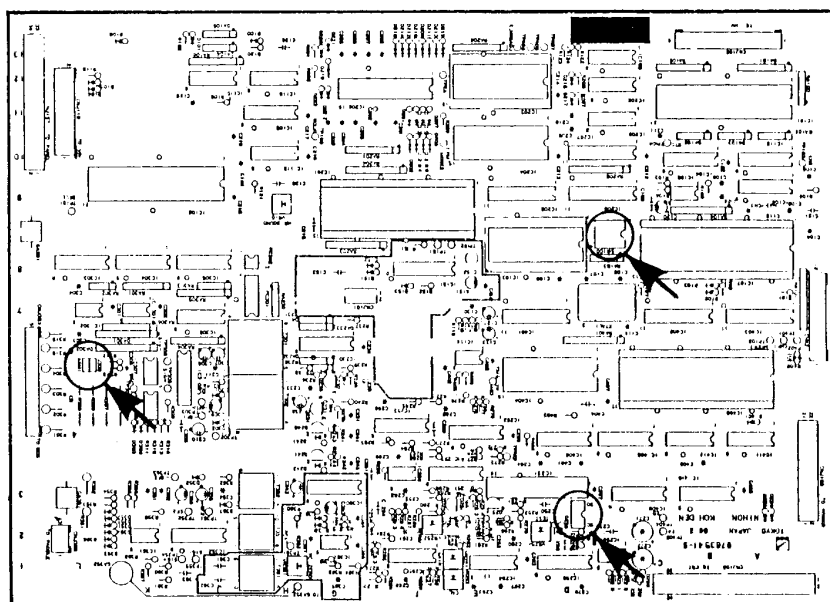
	TEC-7200A	TEC-7200B	TEC-7200C	TEC-7200E	TEC-7200F	TEC-7200G	TEC-7200H	TEC-7200J	TEC-7200K	TEC-7200R
AC Line Voltage	117V	240V	220V	220V	220V	220V	220V	100 / 110 / 117V	220 / 240V	220V
AC Line Frequency	60Hz	50Hz	50Hz	50Hz	50Hz	50Hz	50Hz	50 / 60Hz	50 / 60Hz	50Hz
Chassis parts	YZ-002G1	YZ-002G2	YZ-002G3	YZ-002G9	YZ-002G4	YZ-002G5	YZ-003G1	YZ-002G7	YZ-002G8	YZ-002G6
External paddle	ND-702V	ND-702V	ND-702V	ND-702VE	ND-702VF	ND-702VG	ND-702VH	ND-702V	ND-702V	ND-702VR
Internal paddle	ND-704V	ND-704V	ND-704V	ND-704VE	ND-704VF	ND-704VG	ND-704VH	ND-704V	ND-704V	ND-704VR
Power unit	SC-701VA	SC-701VB	SC-701VC	SC-701VE	SC-701VF	SC-701VG	SC-701VH	SC-701VJ	SC-701VK	SC-701VR
Recorder unit	WS-701VA	WS-701VA	WS-701VC	WS-701VE	WS-701VF	WS-701VG	WS-701VH	WS-701VA	WS-701VA	WS-701VR
VR and connector BD	UP-76391	UP-76392	UP-76392	UP-76397	UP-76395	UP-76393	UP-76398	UP-76392	UP-76392	UP-76396
ECG/CPU BD with ROM	US-76352	US-76354	US-76354	US-76358	US-7635F	US-76356	US-7635J	US-76354	US-76354	US-7635R
High voltage BD	UP-7636	UP-7636	UP-7636	UP-7636	UP-7636	UP-7851	UP-7636	UP-7636	UP-7636	UP-7636
Relay BD	-----	-----	-----	-----	-----	UP-7850	-----	-----	-----	-----
Test detect BD	UP-7596	UP-7596	UP-7596	UP-7596	UP-7596	UP-7596G	UP-7596	UP-7596	UP-7596	UP-7596
Transmitter	ZB-312PA	-----	ZB-512V	-----	-----	-----	-----	ZB-512V	ZB-512V	-----
Receiver	ZR-702V	-----	ZR-701VK	-----	-----	-----	-----	ZR-701VK	ZR-701VK	-----
Battery charger	SB-642PA	SB-642PK	SB-642PK	-----	-----	-----	-----	SB-642PK	SB-642PK	-----

1. GENERAL DESCRIPTION

TEC-7300 Series

	TEC-7300A	TEC-7300C	TEC-7300E	TEC-7300G	TEC-7300J	TEC-7300K
AC Line Voltage	117V	220V	220V	220V	100 / 110 / 117V	220 / 240V
AC Line Frequency	60Hz	50Hz	50Hz	50Hz	50 / 60Hz	50 / 60Hz
Chassis parts	YZ-003G4					
External paddle	ND-702V	ND-702V	ND-702VE	ND-702VG	ND-702V	ND-702V
Internal paddle	ND-704V	ND-704V	ND-704VE	ND-704VG	ND-704V	ND-704V
Power unit	SC-701VA	SC-701VC	SC-701VE	SC-701VG	SC-701VJ	SC-701VK
Recorder unit	WS-702VA	WS-702VC	WS-702VE	WS-702VG	WS-702VA	WS-702VA
VR and connector BD	UP-76391	UP-76392	UP-76397	UP-76393	UP-76392	UP-76392
ECG/CPU BD with ROM	US-7737	US-7737	US-77372	US-77371	US-7737	US-7737
High voltage BD	UP-7636	UP-7636	UP-7636	UP-7851	UP-7636	UP-7636
Relay BD	-----	-----	-----	UP-7850	-----	-----
Test detect BD	UP-7596	UP-7596	UP-7596	UP-7596G	UP-7596	UP-7596
Transmitter	ZB-312PA	ZB-512V	-----	-----	ZB-512V	ZB-512V
Receiver	ZR-702V	ZR-701VK	-----	-----	ZR-701VK	ZR-701VK
Battery charger	SB-642PA	SB-642PK	-----	-----	SB-642PK	SB-642PK

1-4 Internal Switch Setting (ECG/CPU Board)



SW100 Mode select switch (Not mounted on TEC-7300)

No.	ON	OFF
1, 2	Not used	Not used
3	Synchronization mode is not released when the energy is discharged (Initial setting for other than TEC-7100 / 7200A).	Synchronization mode is re-leased when the energy is dis-charged. For the next cardiover-sion, press the SYNC button again (Initial setting for TEC-7100 / 7200A).
4	TEC-7100	TEC-7200

SW102 AC filter frequency select switch

No.	ON	OFF
1, 2	60Hz	50Hz

J300 ECG connection cable select socket

AAMI	The other position
TEC-7100 / 7200/7300A	Other than TEC-7100 / 7200/7300A

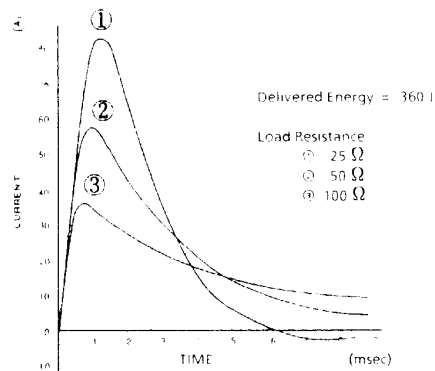
Section 2 SPECIFICATIONS

CONTENTS

	Page
Defibrillation Section	2.1
ECG Amplifier Section	2.3
Monitor Section	2.4
Recorder Section	2.5
Battery	2.6
External Paddle	2.7
General	2.8

◆ DEFIBRILLATOR SECTION

Output Energy: 3, 5, 10, 20, 30, 50, 70, 100, 150, 200, 300, and 360J (at 50 Ω load)
 Energy Limit: 50 J max. for the internal paddles
 Output Waveform: Edmark



Charging Time: $\leq$ 10 sec (AC power supply)
 $\leq$ 12 sec (Fully charged new battery)

Synchronization Trigger: I, II, III, aVR, aVL, aVF, V, test, and external ECG
 Paddle synchronization is available according to the DIP switch setting.

Discharge Test: "TEST OK" is displayed on the CRT when energy of 50 J is normally discharged to the built-in test load. If energy of other than 50J is discharged to the test load, "NG (TEST AT 50J)" is displayed.

Charge Status Indication: LED indicator on the main unit and paddle
 During charging: Blinks
 After charge is complete: Lit
 Energy value display on the CRT
 During charging: Blinks
 After charge is complete: Lit

Discharge Timing: Continuous tone is emitted after charge is complete.
 $\leq$ 30 msec after discharge buttons are pressed (async mode)
 $\leq$ 30 msec after a synchronized point (sync mode)

Automatic Internal Discharge:	Stored energy is internally discharged in the following cases: 40sec (± 5sec) after charging starts. - Power is turned off. - Energy selector is set to ECG/MON. 300 msec after energy discharge when the power source is changed from AC to battery during energy charging. - Paddles are disconnected from the main unit.
Automatic Synchronization Reset:	Sync mode is automatically turned off (async mode) when the energy is discharged (TEC-7100/7200/7300A).
Paddle Contact Impedance: (TEC-7200/7300)	Indicated by three colored LEDs on the sternum paddle. - Green: 0 to 100Ω - Yellow: 100 to 200Ω - Red: $\geq 200\Omega$
Transthoracic Resistance: (TEC-7200/7300)	Printed when energy is discharged to the patient.
Delivered Energy: (TEC-7200/7300)	Printed when energy is discharged to the patient.

◆ ECG AMPLIFIER SECTION

Input:	5-electrode mode: Paddle, telemetry (when the receiver is connected), I, II, III, aVR, aVL, aVF, V, external input, and test 3-electrode mode: Paddle, telemetry (when the receiver is connected, TEC-7300), I, II, III, and test
Gain:	$\times 1/2$, $\times 1$, $\times 2$, $\times 4$ and $\times \text{AG}$ (Auto Gain)
Frequency Response:	0.5 to 100 Hz (through ECG electrodes, MON mode) 0.05 to 100 Hz (through ECG electrodes, ECG mode) 0.5 to 30 Hz (through paddles)
CMRR:	≥ 95 dB
Input Impedance:	$\geq 5 \text{ M}\Omega$ at 10 Hz, through ECG electrodes $\geq 100 \text{ K}\Omega$ at 10 Hz, through paddles
Patient Leakage Current:	$\leq 10 \mu\text{A}$
Internal Noise:	$\leq 35 \mu\text{Vp-p}$, referred to input
Skinvoltage Tolerance:	$\geq \pm 300 \text{ mV}$
Leads Off Alarm:	Detected by electrode detachment
AC Filter:	Provided
Pacing Pulse Rejection:	Provided
External Input:	10 mm/V on CRT at gain of $\times 1$
External Output:	1 V/mV
QRS Sync Sound:	Provided with a sound level adjustment
Calibration Waveform:	Square waveform of 1 mV (referred to input)
Test Waveform:	QRS simulated waveform of approx. 1 mV, 100 msec and 60 bpm
Heart Rate Count Range:	12 to 300 bpm
Heart Rate Alarm:	
High limit:	15 to 300 bpm, 5 bpm/step, and off
Low limit:	15 to 295 bpm, 5 bpm/step, and off
VPC Rate Count Range:	0 to 99 bpm
(TEC-7300)	
VPC Rate Alarm:	1 to 99 bpm, 1 bpm/step, and off
(TEC-7300)	

◆ MONITOR SECTION

* : When the QI-701VA is used

CRT:	Non-fade, 5.5 inches, electromagnetic deflection type
Effective Display Area:	100H × 85V (mm)
Display Method:	Non-fade, X-Y display
Sweep Speed:	25 mm/sec
Sweep Length:	100 mm
Frequency Response:	DC to 30 Hz (−3 dB)
Max. Waveform Deflection:	40 mm / trace
Baseline Position:	Fixed
Sync Mark	Spot display on a QRS waveform in SYNC mode
Display Mode:	Monitor mode, system set mode, and alarm set mode (TEC-7300) Monitor mode (TEC-7100/7200)
Monitor mode: (TEC-7100/7200)	
Cascaded ECG mode:	Displays ECG and cascaded ECG waveform
Cascaded ECG mode: (TEC-7300)	Displays ECG and cascaded ECG waveform
VPC Mode:	Displays ECG and VPC frozen / recall waveform, VPC detected time, arrhythmia status, and lead
Recall File Capacity:	10 files
Arrhythmia Status:	Asystole, ventricular fibrillation, ventricular tachycardia, VPC run, couplet, bigeminy, and early VPC
Heart Rate Trend Mode:	Displays ECG and heart rate trendgraph Trendgraph includes maxi-mum, minimum and mean heart rate
VPC Trend Mode:	Displays ECG and VPC trendgraph Trendgraph includes VPC rate and mean heart rate
BP Mode: *	Displays ECG and blood pressure waveform
BP Trend Mode: *	Displays ECG and blood pressure trendgraph Trendgraph includes systolic, diastolic, and mean pressure
Trend Time:	2 min, 1, 2, 4, 8, and 24 hour
Trend Data:	60 samples
System Set Mode: (TEC-7300)	
Set Item:	Trend time, periodic record, pacing rejection on/off, discharge summation print, tabular trend on/off, paper speed, ECG record mode (realtime/delayed), and date and time set.
Alarm Set Mode: (TEC-7300)	
Set Item:	Heart rate high and low limit, VPC rate limit, arrhythmia level, alarm record on/off, and systolic pressure limit *
Arrhythmia Level:	Level 1, level 2 and off
Level 1:	Asystole, ventricular fibrillation, ventricular tachycardia, and VPC run
Level 2:	Besides level 1, couplet, bigeminy, and early VPC

◆ RECORDER SECTION

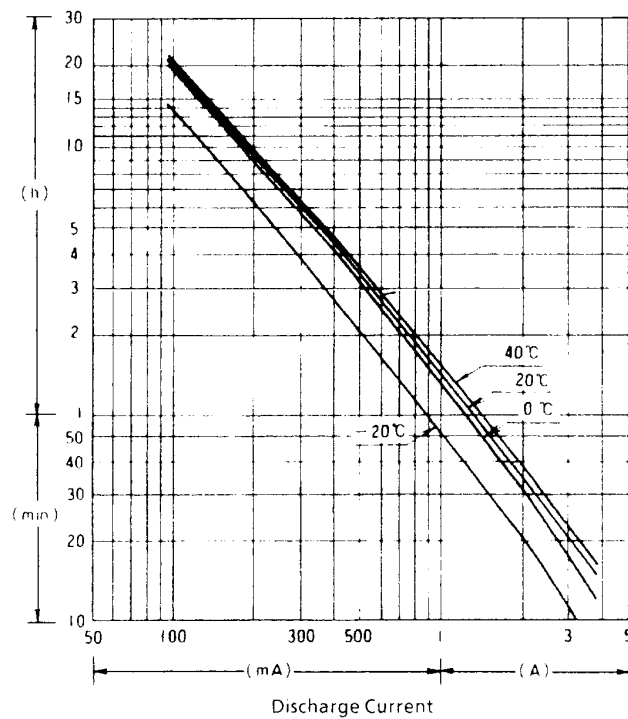
Recording Item:	Realtime ECG waveform, delayed ECG waveform, and frozen waveform (TEC-7100/7200/7300), recall waveform, trendgraph with/without tabular trend, and discharge summation (TEC-7300)
Paper Speed:	25 mm/sec $\pm$ 10% (TEC-7100/7200/7300) 5 mm/sec $\pm$ 15% and 5 & 25 mm/sec alternate selection: (TEC-7300)
Effective Recording Width:	40 mm (waveform) , 3 mm/line (characters)
Frequency Response:	DC to 80 Hz (– 3dB)
Auto Recording:	
Energy Charge Recording:	Records for approx. 15 sec when starting energy charge.
Alarm Recording:	Records for approx. 15 sec when an alarm occurs.
Periodic Recording:	Records for 10 sec at the interval of 1, 10, 15, 30 min, or 1 hour.
(TEC-7300)	
Annotation Printing:	Following items are printed on the upper and lower margin. Items to be annotated depend on the display mode. Discharge mark, selected energy, lead, sensitivity, heart rate, MON/ECG mode, AC filter on/off, REAL/DELAY mode, SYNC mode, sync mark, date, and time (TEC-7100/7200/7300) Transthoracic resistance and delivered energy (TEC-7200/7300)
Recording Paper:	Z-fold paper, type FQS50-3-100, 50 mm $\times$ 30 m Roll paper, type RQS50-3, 50 mm $\times$ 30 m (requires the optional roll paper adaptor RH-701V)
Paper Empty Sensor:	When the paper is used up, recording stops, intermittent tone is emitted, and “PAPER EMPTY” is displayed on the CRT.

◆ BATTERY

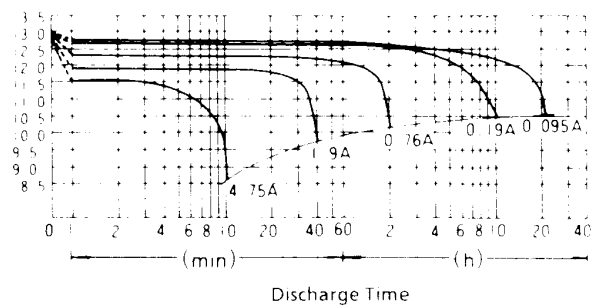
Battery:	LCT-1912NK, lead acid type
Battery Charging Time:	Approximately 2 hours for 80 % charging, and 15 hours for full charge Automatically changed from rapid charging mode to trickle charging mode when fully charged
Capacity:	1.9 AH (20 HR) ≥ 30 times discharge of 360 J by fully charged new battery ≥ 1 hour continuous monitoring by fully charged new battery
Battery Charge Indicator:	Lit (during charging)
Battery Level Indicator:	Battery level is indicated by three LEDs. “LOW BATTERY” is displayed on the CRT when the level is low.
Over-discharge Protector:	Turns off the power when the battery level becomes close to empty to prevent the battery from over-discharge.
Self-discharge:	Battery capacity naturally decreases at temperature of 20°C without using as follows. 3 months: 90 % 6 months: 80 % 12 months: 60 %

Characteristics:

Relationship between discharge current and time at various temperature

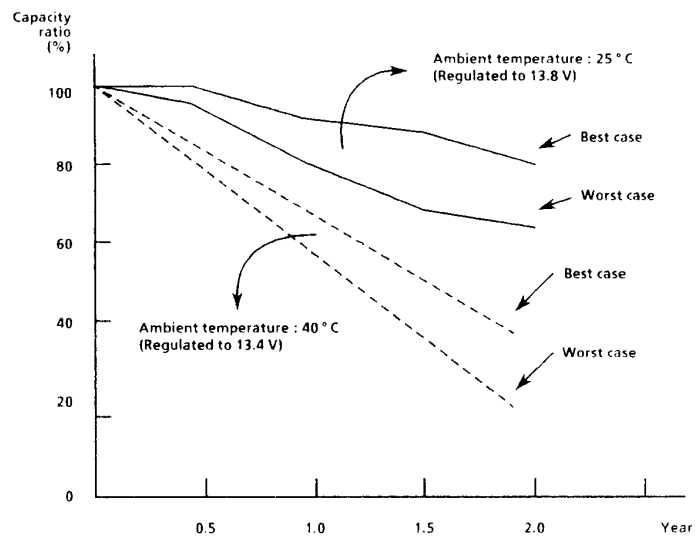


Discharge Characteristic (at 20°C)



Monitoring: Approx. 1A
 Recording: Approx. 0.5A
 Energy charging: Approx. 8A

Lifetime in Trickle Charging



◆ EXTERNAL PADDLE

Electrode Size: 70×106 mm (Adult), 45,8×53.8 mm (Pediatric)
 Cable Length: 2.5 m

◆ GENERAL

Operating Temperature:	0~35°C
Power Requirement:	Refer to System Component Table (Pg. 1.10 to 1.12).
Power Consumption:	<200VA (TEC-7100/7200) <250VA (TEC-7300)
Dimensions:	344W×195H×370D mm (excluding paddles)
Net Weight:	12.3 kg (including paddles, TEC-7100/7200) 12.8 kg (including paddles, TEC-7300)

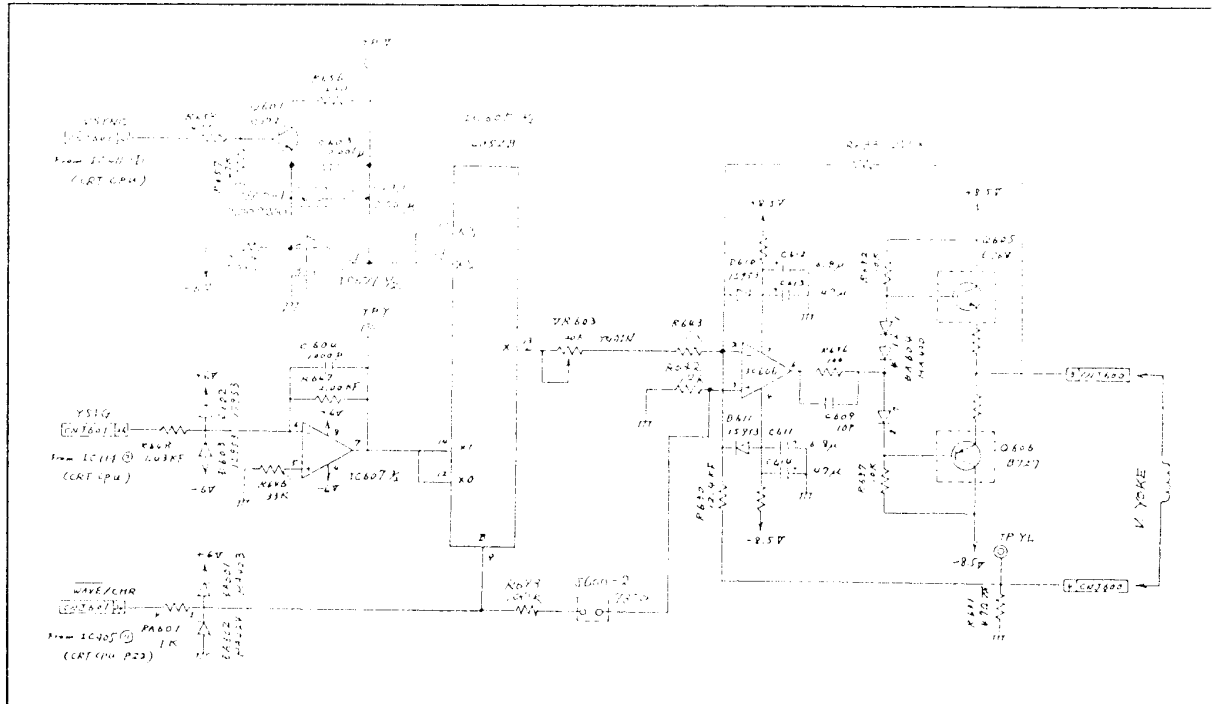
Section 3 THEORY OF OPERATION

CONTENTS

	Page
3-1 System Overview	3.1
3-2 Block Diagrams	3.3
System Block Diagram	3.3
Detailed Block Diagram	3.3
3-3 ECG/CPU Board UP-7635 / 76351 / 7737	3.7
3-3-1 ECG Amplifier	3.7
ECG Input and Lead Selection	3.7
Leads-off Detection	3.9
ECG Isolation	3.10
Paddle Lead ECG Input	3.12
Paddle Lead ECG Isolation	3.13
Paddle Contact Impedance Detection (TEC-7200/7300)	3.15
Test Waveform Generator	3.16
Input Selector	3.17
Baseline Restorer, Time Constant and INST Control	3.18
External Inputs	3.20
AC Filter	3.21
Sensitivity Selection	3.22
ECG Analog Output	3.23
External Outputs	3.24
3-3-2 ECG CPU	3.25
Outline	3.25
Communication with the Host CPU	3.27
Processing Cycle	3.28
ECG CPU Pin Description	3.29
3-3-3 HOST CPU (Main Section with UP-7638 Front Panel Board)	3.31
Outline	3.31
Host CPU	3.32
Host CPU Pin Description	3.32
I / O Port Pin Description	3.34
Key Entry (UP-7638)	3.36
Energy Selection	3.38
LED Display (UP-7638)	3.38

	Sound Control	3.42
	Power-on Reset	3.46
	Runaway Detection	3.47
	Real-time Clock	3.48
	Data Transfer to Recorder	3.49
3-3-4	CRT CPU	3.51
	Outline	3.51
	Communication with the Host CPU	3.51
	One-frame Display Cycle	3.53
	Character Data Transfer to CRT Driver	3.54
	Waveform Data Transfer to CRT Driver	3.58
	Peak-bottom Processing	3.59
	CRT CPU Pin Description	3.60
3-4	CRT Driver UP-7740	3.62
	Outline	3.62
	Horizontal Deflection Driver	3.63
	Vertical Deflection Driver	3.65
	Vertical Position Control	3.67
	Blanking	3.68
	QRS Sync Spot	3.68
3-5	High Voltage Board UP-7636 / 7851	3.69
	Outline	3.69
	Switching Control	3.69
	Charge Energy Monitor	3.71
	Internal Discharge	3.71
	External Discharge	3.72
	TTR Detection (Not used in TEC-7100)	3.73
	Discharge Test Detection	3.74
3-6	Motor Drive Control UP-7738	3.75
	Outline	3.75
	Rotation Sensor	3.76
	Phase Locked Loop	3.76
	Integrator	3.77
	Start / Stop Control	3.77
	Paper Feed Control	3.77
	Running Out of Paper	3.78
	Power Supply	3.78
3-7	Power Unit SC-701V	3.79
	Outline	3.79
	AC Power Supply	3.79
	AC/DC Switching Control	3.80
	Relay Control	3.80
	DC/DC Switching Control	3.81
	Battery Charger	3.82
	Battery Charge Indication	3.83

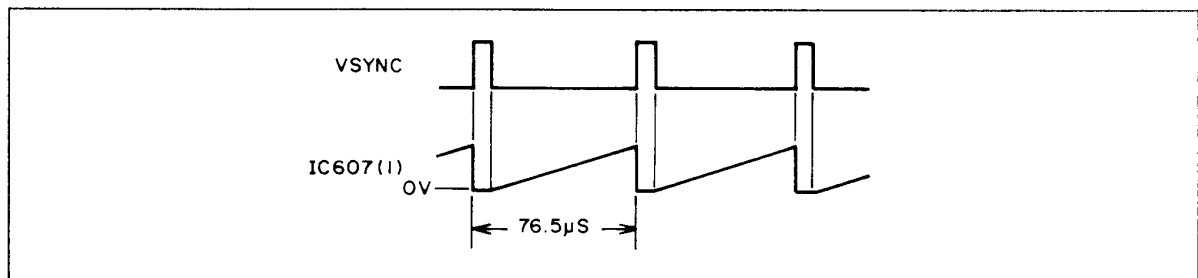
Vertical Deflection Driver



Character Display Mode

VSYNC triggers the integrator IC607-1 to generate a sawtooth waveform which is amplified by IC606 and Q605~606 to drive the vertical deflection yoke for the vertical scan. While VSYNC is high, Q601 turns on, and IC607-1 is reset to 0V. While low, C603 is charged by -6V to generate a positive sawtooth. Multiplexer IC605-2 selects X2/X3 when WAVE/CHAR is high.

Vertical Scan Sawtooth



3. THEORY OF OPERATION

Waveform Display Mode

D/A converted ECG waveform YSIG is amplified by IC607-2 with a gain of 1.4. High-cut filter of 80Hz consists of R647 and C604 to smooth the waveform. Multiplexer IC605-2 selects X0/X1 when WAVE/CHAR is low.

Driver

In the character display mode, when the input voltage of IC606 starts increasing, the output decreases, the base voltage of Q605~606 decreases, the emitter voltage becomes negative, the current flows from CNJ600-4 to CNJ600-3 through the yoke, and the scan is initiated slightly above the top of the character display area. In the waveform display mode, the YSIG controls the vertical yoke current in the same manner. IC606 has two feedback loops. The main feedback is through R630, and the yoke is delayed due to the inductance of the yoke. The feedback through R633 and VR607 compensates this delay to initiate the beam quickly. The amount of the compensation feedback is adjusted with VR607 for the distortion adjustment of characters in the top area. The vertical deflection width is adjusted by VR603.

Jumper Setting for Instrument Type

The jumper J600 is set according to the type of instrument, TEC-7100/7200 or TEC-7300. This selection determines the deflection amplitude (J600-1) and the vertical position (J600-2) of the vertical scan in the character display mode.

	TEC-7100/7200	TEC-7300
J600-1	ON	OFF
J600-2	OFF	ON

3-1 System Overview

This defibrillator is controlled by three CPUs : host CPU, ECG CPU and CRT CPU. The host CPU mainly controls other CPUs and transfers the data among them. Refer to block diagrams on the following pages.

ECG signal processing

The host CPU sends the data such as key status to the ECG RAM. According to this data, the ECG CPU controls the ECG amplifier and A/D converter. An interrupt signal sent regularly from the host CPU to the ECG CPU allows the A/D converter to start conversion. The converted data is transferred to the host CPU through the ECG RAM. A leads-off signal and a paddle contact impedance signal are also sent to the host CPU.

The ECG CPU detects a QRS synchronization point, and calculates the heart rate for the host CPU. In the TEC-7300, the ECG CPU also detects VPCs and calculates the VPC rate.

CRT display

The host CPU sends data such as key status, waveform, and characters to the CRT CPU through the CRT RAM in a certain cycle. The CRT CPU generates control signals such as sync signal and blanking signal to display waveforms and characters.

Recorder

When the host CPU recognizes that the record key is pressed, the host CPU sends the control signals to the motor control board which controls the rotation of the paper feed motor at a constant speed. The host CPU also sends the serial data to the thermal head to print characters and waveforms.

Energy Charge

The energy charge/discharge is controlled by host CPU according to the key status. The host CPU sends the charge control signal through the I/O port to the energy charge circuit to supply high voltage to the energy capacitor in the high voltage block. During charging, the charged energy is monitored by the host CPU through the A/D converter. When discharged, the energy detected by the TTR circuit is A/D converted and the host CPU calculates the delivered energy (TEC-7200/7300). When discharged to the test load, the host CPU recognizes whether the test discharge has been done normally or not through the test detection circuit.

3. THEORY OF OPERATION

Key Entry and LED display

The host CPU recognizes key on/off status through the key/LED interface by scanning and I/O port. The LED display is also controlled by the key/LED interface.

Host CPU

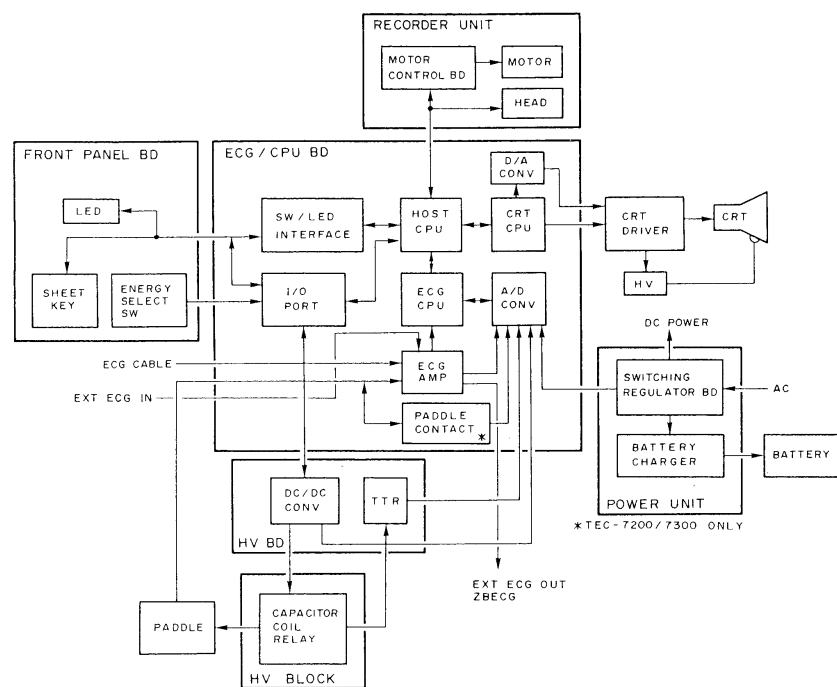
Besides the above, the host CPU controls the various kinds of sound, communicates with the real-time clock and reads the DIP switch setting. When the host CPU runs away and the absence of certain pulses is detected, all CPUs are reset.

Power Unit

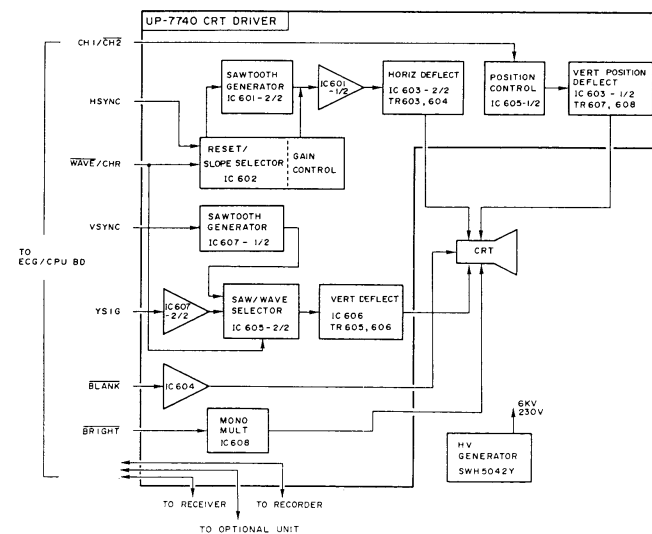
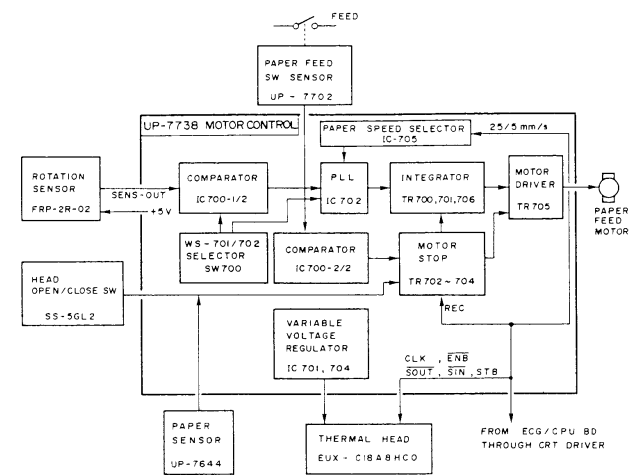
The switching regulator supplies power to all units on AC line or battery. The supply voltage of the power unit is monitored by the host CPU. The battery is charged in the cycle or trickle charging mode.

3-2 Block Diagrams

System Block Diagram

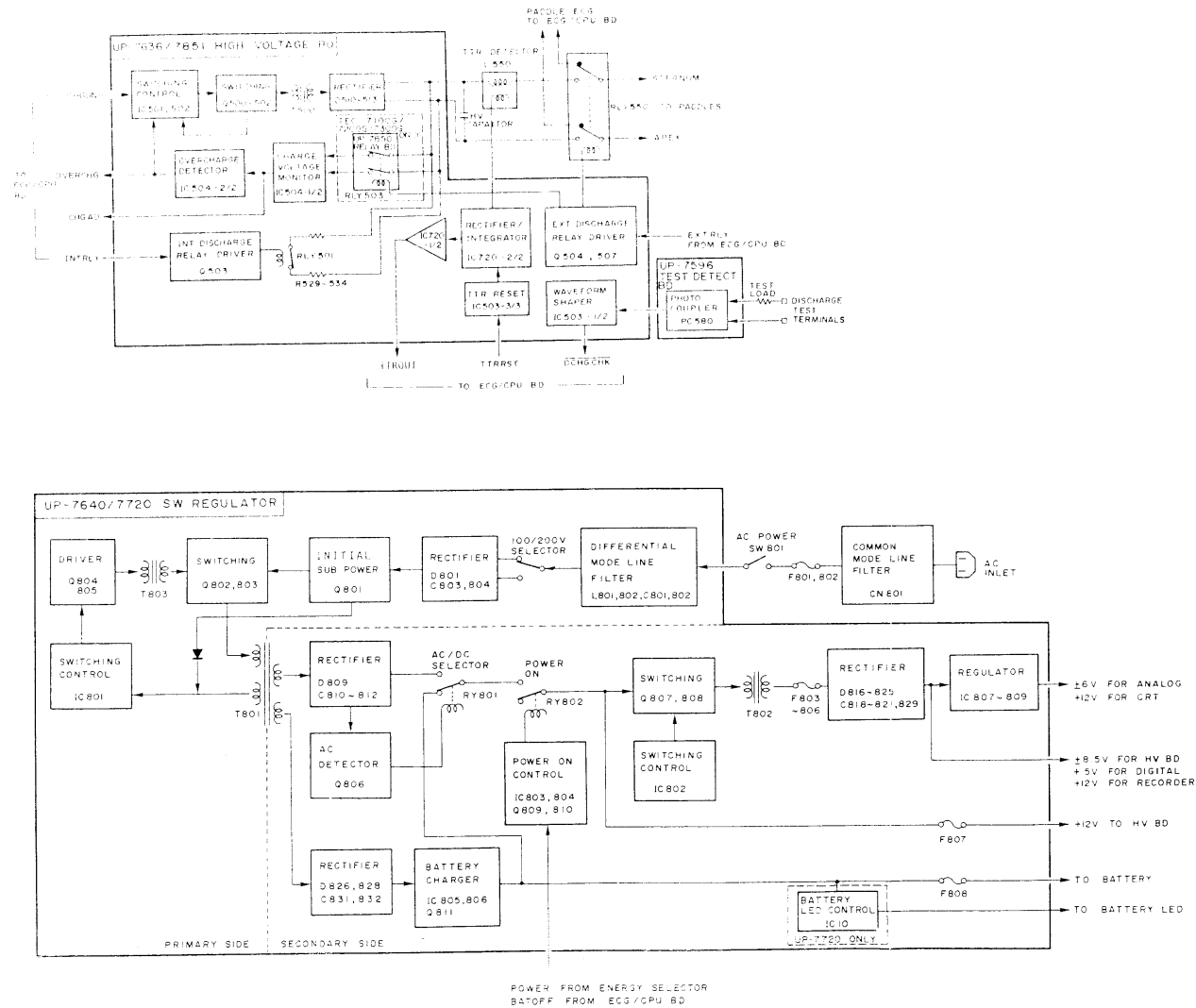


Detailed Block Diagram



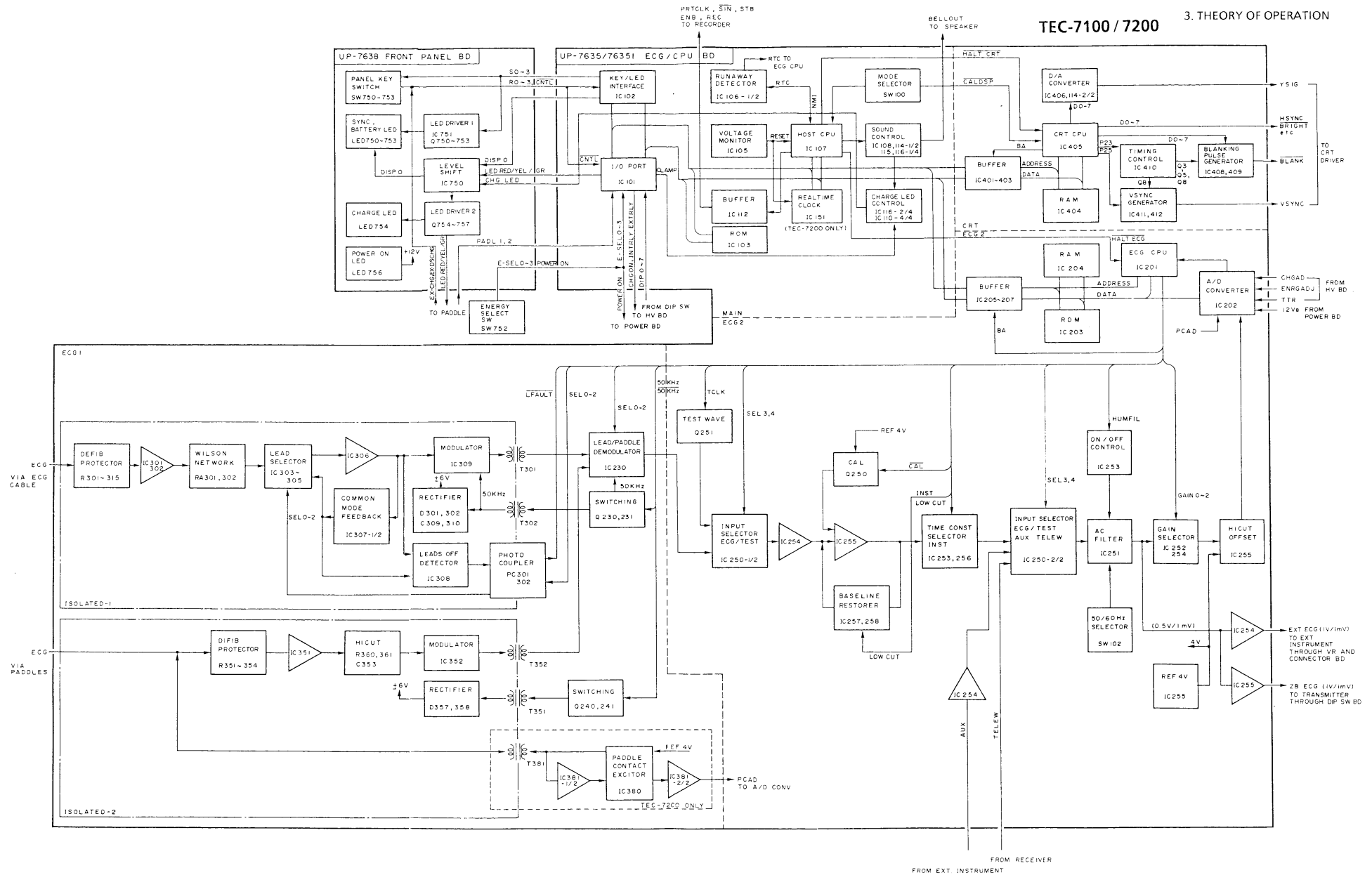
TEC7100/7200/7300.01

3. THEORY OF OPERATION



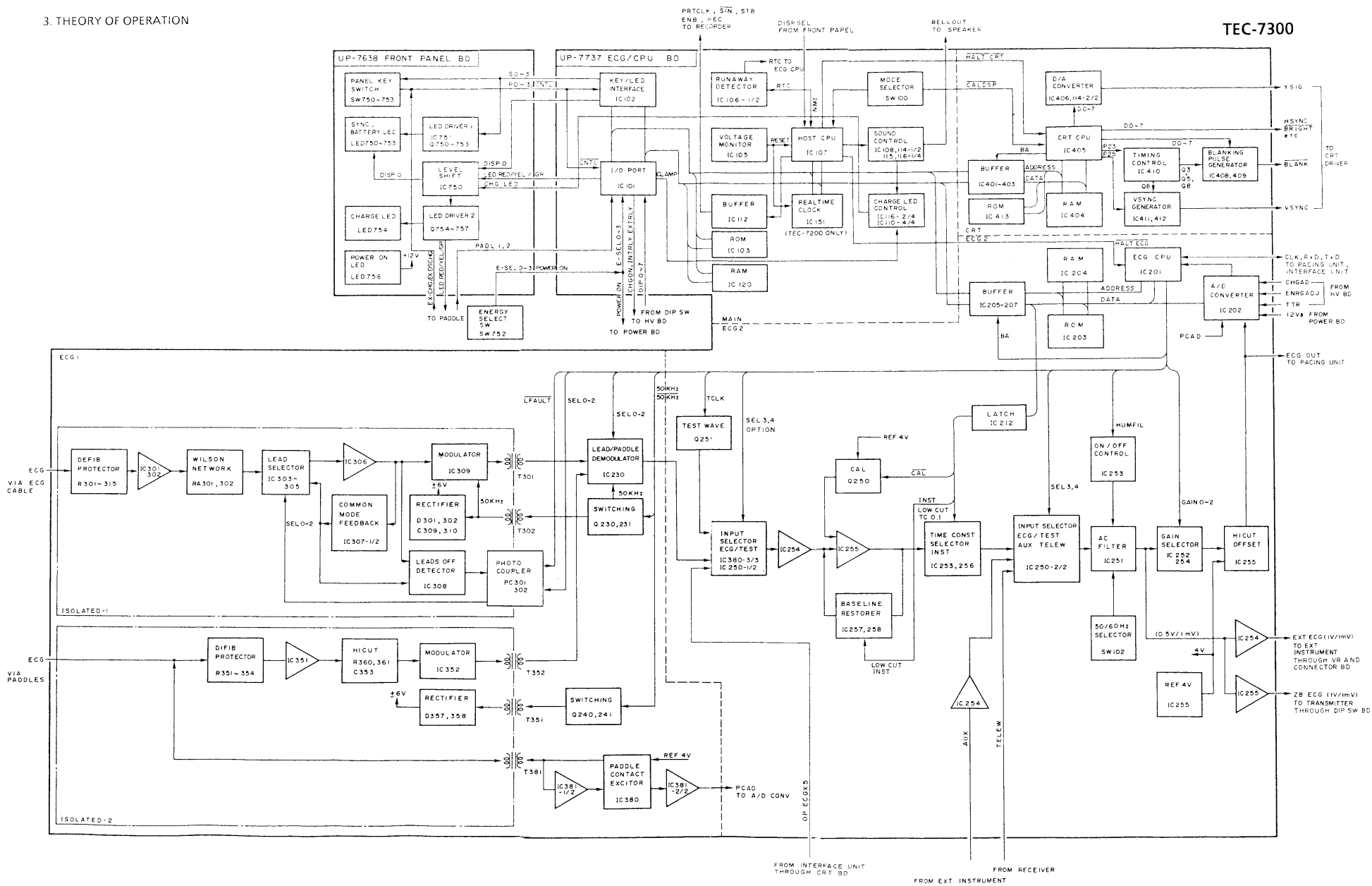
TEC-7100 / 7200

3. THEORY OF OPERATION



TEC7100/7200/7300.01

3. THEORY OF OPERATION



3-3 ECG/CPU Board UP-7635/76351/7737

ECG/CPU Board consists of four blocks : ECG amplifier, ECG CPU, host CPU and CRT CPU section. Front panel board UP-7638 is also described in the host CPU section.

ROM Version Display

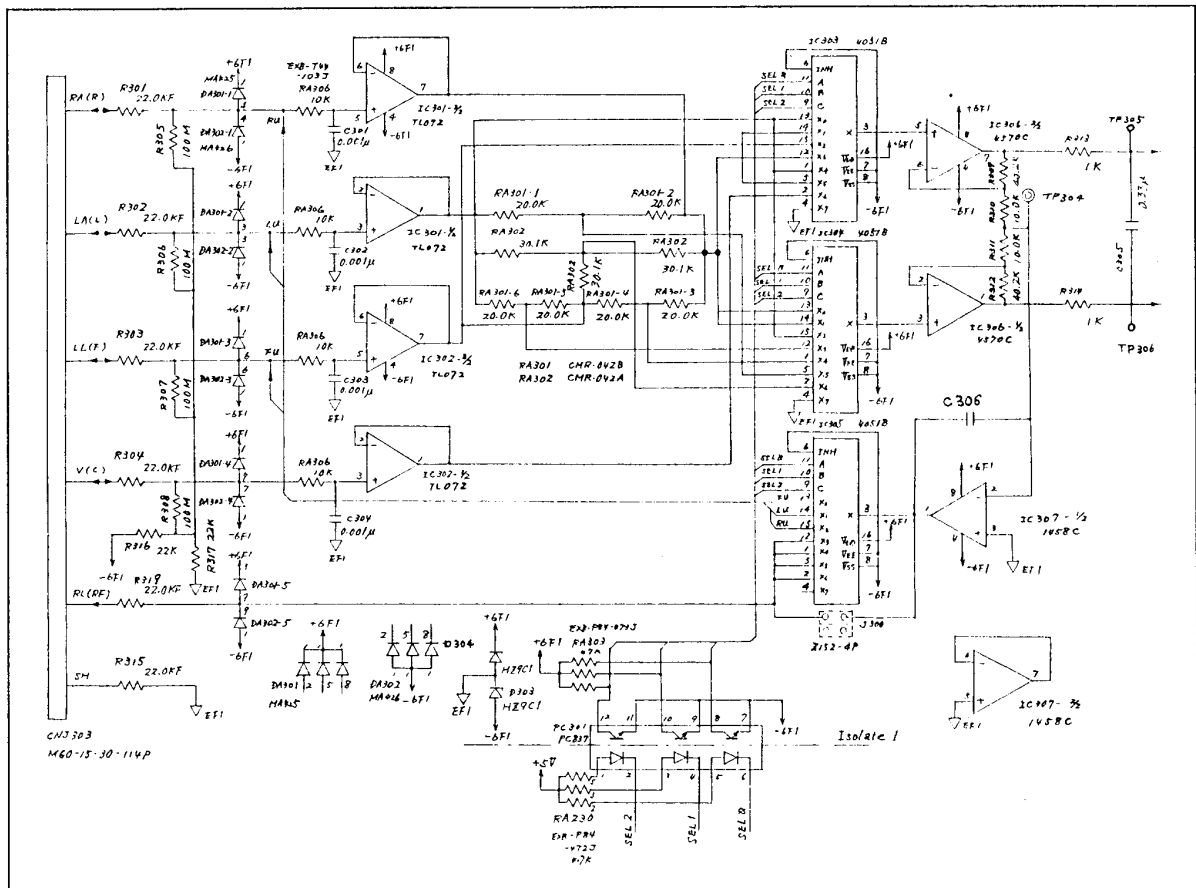
The version of ROMs on the ECG/CPU board can be displayed by following operations.

TEC-7100/7200: Turn on the power while pressing the ↑ key.

TEC-7300: Press both CAL and FREEZE key simultaneously.

3-3-1 ECG Amplifier

ECG Input and Lead Selection



3. THEORY OF OPERATION

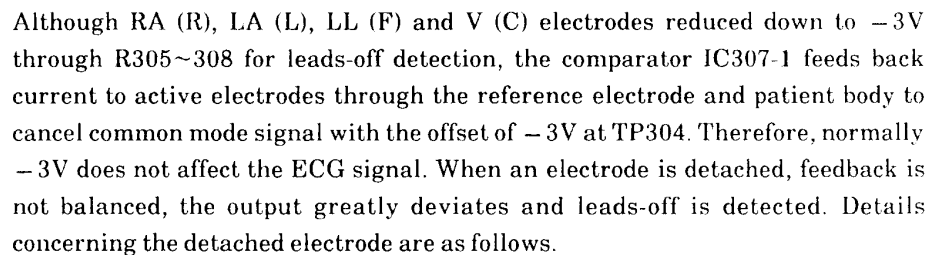
The ECG signals are selected as a lead and sent to the modulator. To improve CMRR, a common mode signal is fed back to the reference electrode.

The ECG signals are sent to the buffer amplifier IC301~302. R301~304, RA306 and C301~304 compose the high-cut filter of 5KHz to eliminate high frequency noise. DA301~302 limit the excessive input voltage for circuit protection. R305~308, 316 and 317 reduce the input to - 3V when an electrode is detached for leads-off detection. The outputs of the Wilson network RA301 ~ 302 are selected by the multiplexer IC303~304. Control signals (+ 5V/0V) from the ECG CPU are isolated and converted to (+ 6V/-6V) by the photocoupler PC301. Relationship between control signals (SEL 0~2) and selected leads are as follows.

Lead Selection IC303 ~ 304

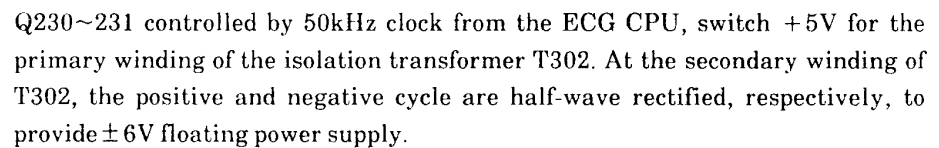
Control			Out			Lead
SEL0	SEL1	SEL2	X	IC303	IC304	
0	0	0	X0	LA (L)	RA (R)	I
0	0	1	X1	LL(F)	RA (R)	II
0	1	0	X2	LL(F)	LA (L)	III
0	1	1	X3	RA (R)	LL(F) & LA (L)	aVR
1	0	0	X4	LA (L)	LL(F) & RA(R)	aVL
1	0	1	X5	LL(F)	RA (R) & LA (L)	aVF
1	1	0	X6	V (C)	RA (R), LA (L) & LL(F)	V
1	1	1	X7	EF1	EF1	OFF (Paddle Lead)

Selected signals are amplified by IC306 with a gain of 5 ($= (R310 + R309) / R310 = (R311 + R312) / R311$). R313~314 and C305 compose the high-cut filter of 240Hz. A common mode signal at TP304 is fed back to the reference electrode by the comparator IC307-1. See leads-off section for the selection of IC305. Even when excessive voltage is input and DA301~302 are turned on, the power supply voltage is maintained within $\pm 9V$ by D303~304.



When an active electrode is detached, for example, in leads I~III, the potential of the detached electrode becomes $-3V$. IC307-1 feeds back current to the other active electrode to generate $+3V$. IC306 (1) saturates to positive or negative. Either comparator IC308-1 or IC308-2 becomes low (IC308 outputs are open collectors) and photocoupler PC817 outputs a low LFAULT signal.

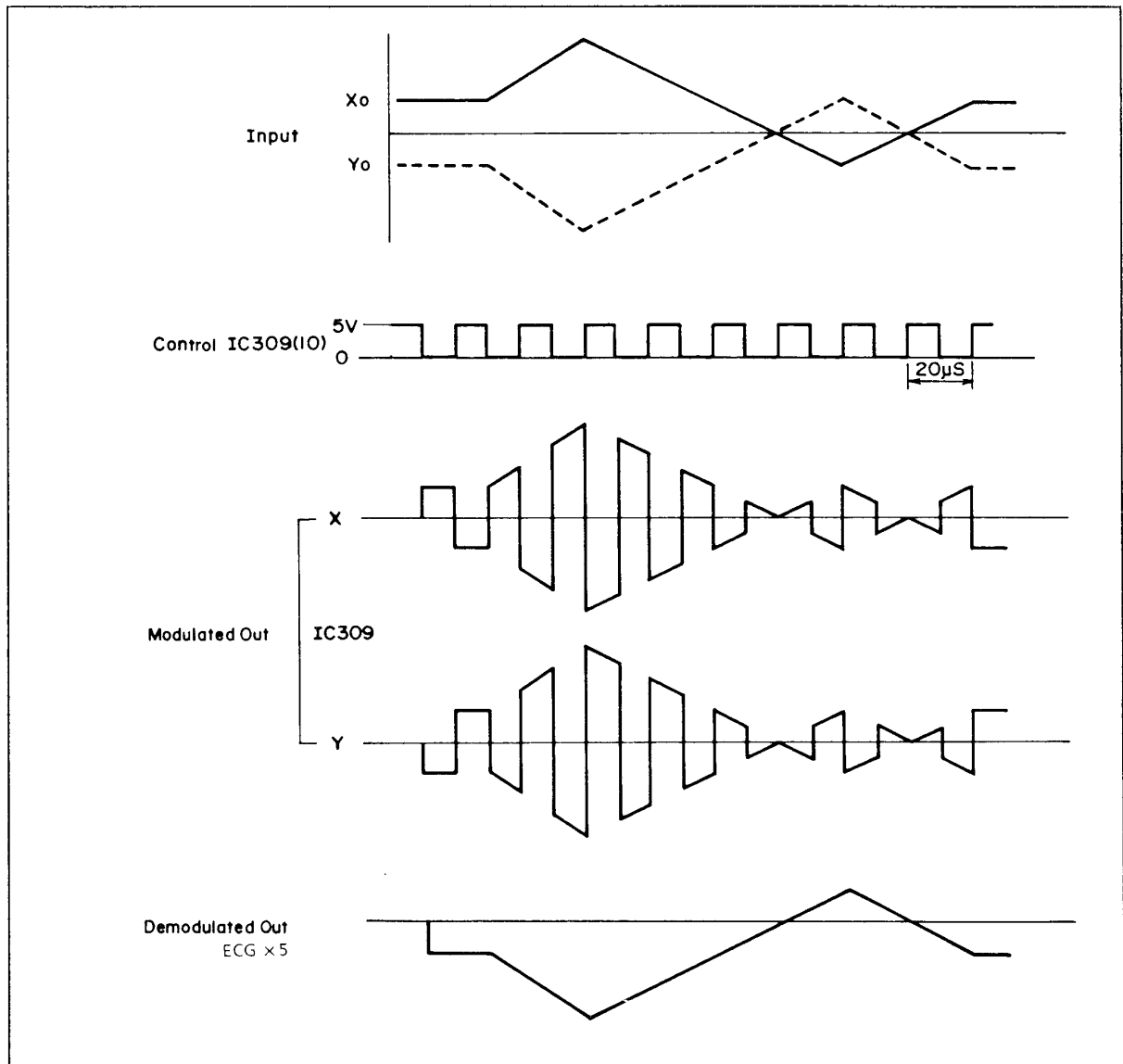
ECG Isolation



The timing diagram consists of three vertically stacked waveforms. The top waveform, labeled T302(1), is a square wave oscillating between 0 and approximately 10V. The middle waveform, labeled T302(4), is a square wave oscillating between 0 and approximately 10V. The bottom waveform, labeled T302(5), is a square wave oscillating between +6V and -6V. A horizontal scale bar above the first waveform indicates a duration of 20μs.

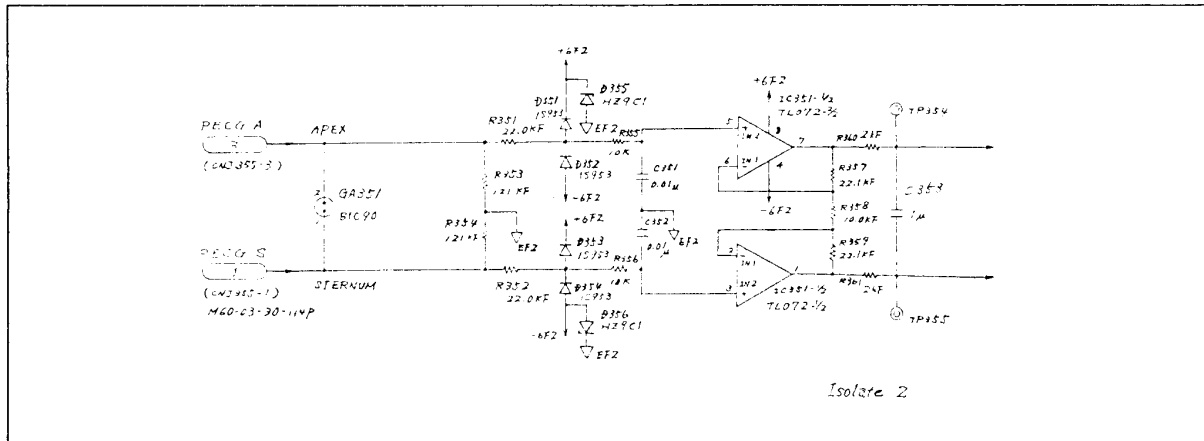
ECG Modulation / Demodulation

The output of T302 controls the multiplexer IC309 to modulate the ECG waveform. The modulated ECG waveform is transferred through T301 and demodulated by IC230. DA232~233 limit the T301 output voltage to approximately the power voltage. IC230 selects either standard lead ECG or paddle lead ECG controlled by SEL0~2.



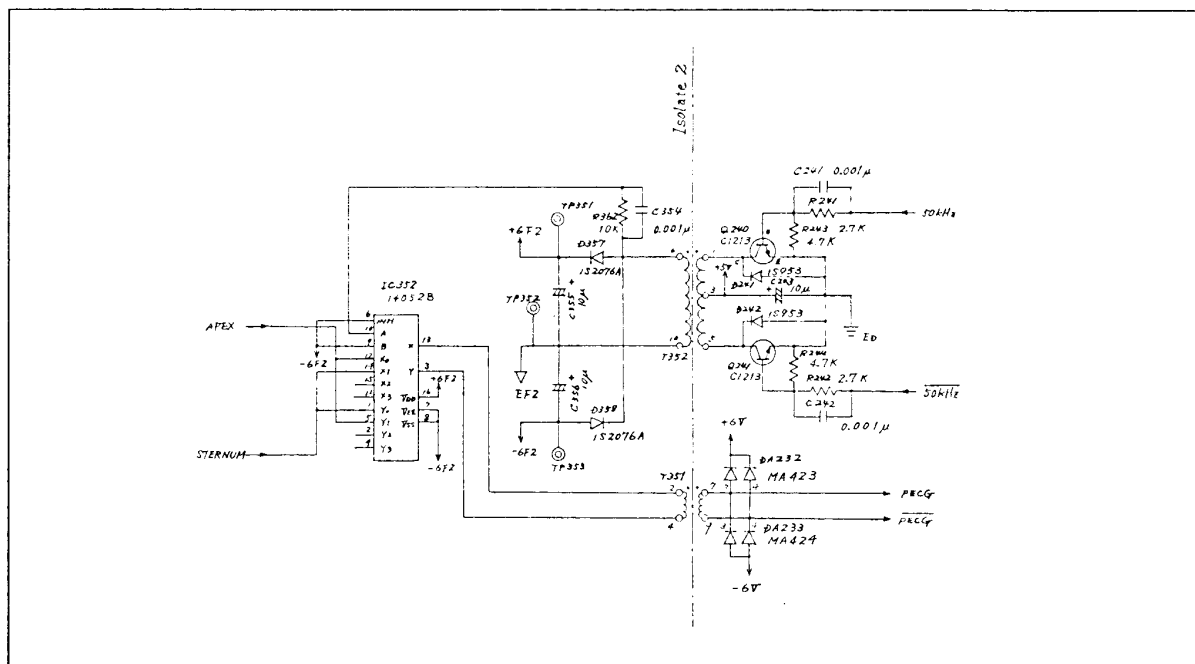
3. THEORY OF OPERATION

Paddle Lead ECG Input

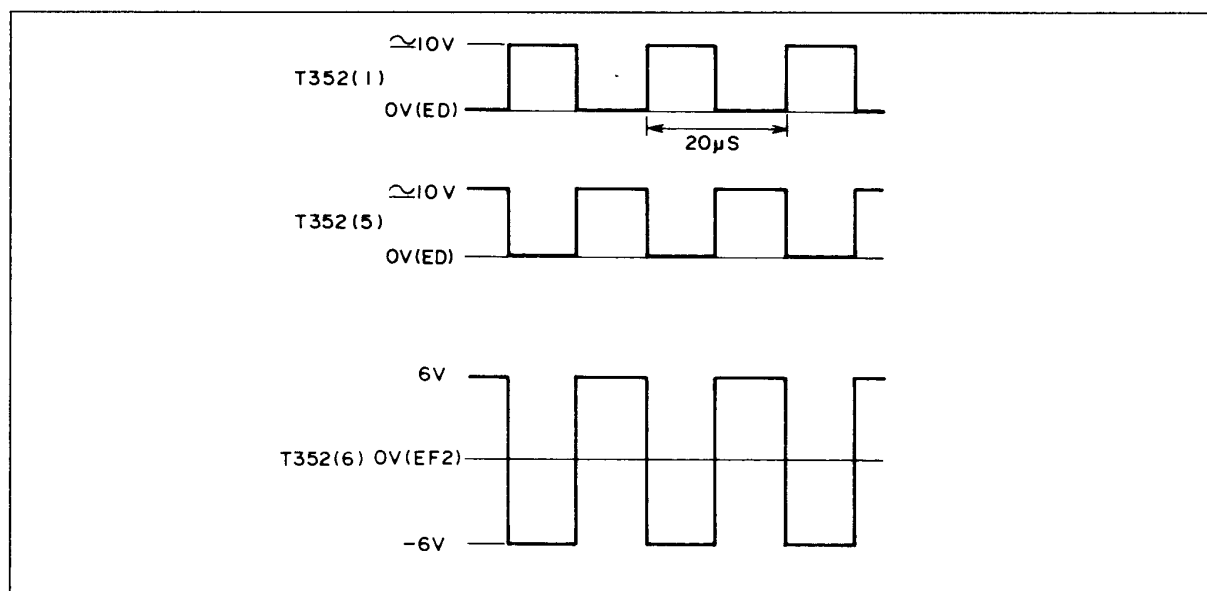


Paddle lead ECG is input through the external discharge relay RLY550 to CNJ355. Input impedance is 242k Ω determined by R353~354. The high-cut filter of 497Hz is composed of R351, R355, C351, R352, R356 and C352 to eliminate high frequency noise. The gain of IC351 is 5.4 ($= (R357 + R359) / R358 + 1$). The high-cut filter of 40Hz is composed of R360, R361, and C353. Even when excessive voltage is input and D351~354 are turned on, the power supply voltage is maintained within $\pm 9V$ by D355~356. R351~352 limit current for excessive input to protect D351~354.

Paddle Lead ECG Isolation



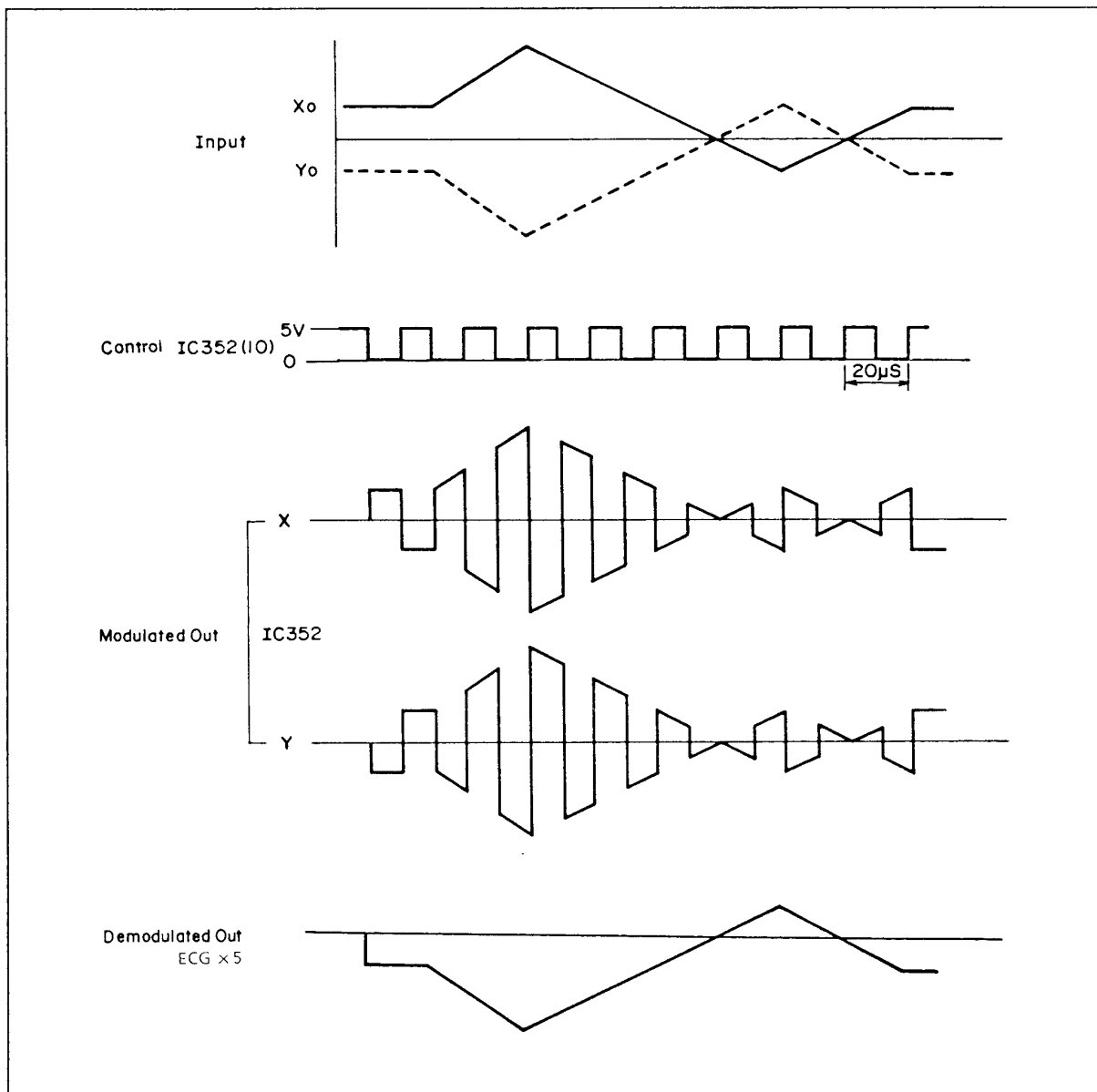
Q240~241 switches +5V controlled by 50kHz clock from the ECG CPU for the primary winding of the isolation transformer T352. At the secondary winding of T352, the positive and negative cycle are half-wave rectified, respectively, to provide $\pm 6V$ floating power supply.



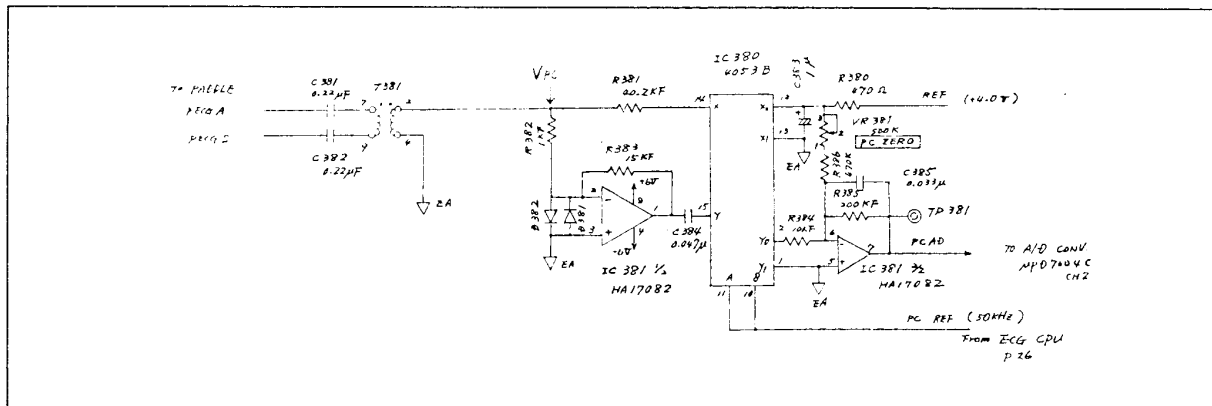
3. THEORY OF OPERATION

ECG Modulation / Demodulation

The output of T352 controls the multiplexer IC352 to modulate the ECG waveform. The modulated ECG waveform is transferred through T351 and demodulated by IC230. DA232~233 limit the T351 output voltage to approximately the power voltage. IC230 selects either standard lead ECG or paddle lead ECG controlled by SEL0~2.



Paddle Contact Impedance Detection (TEC-7200/7300)



Applying a square waveform of 50kHz to the paddle, the paddle contact impedance is detected by measuring the current. The paddle circuit is isolated from the excitor / detector circuit by T381 for safety.

A reference voltage of 4.0V supplied by IC255-1 is switched by multiplexer IC380 to provide the square waveform at X (14). The voltage of the square signal is divided by R381 and the impedance Z. Detected voltage V_{pc} sent to IC381-1 with a gain of 15 times is expressed :

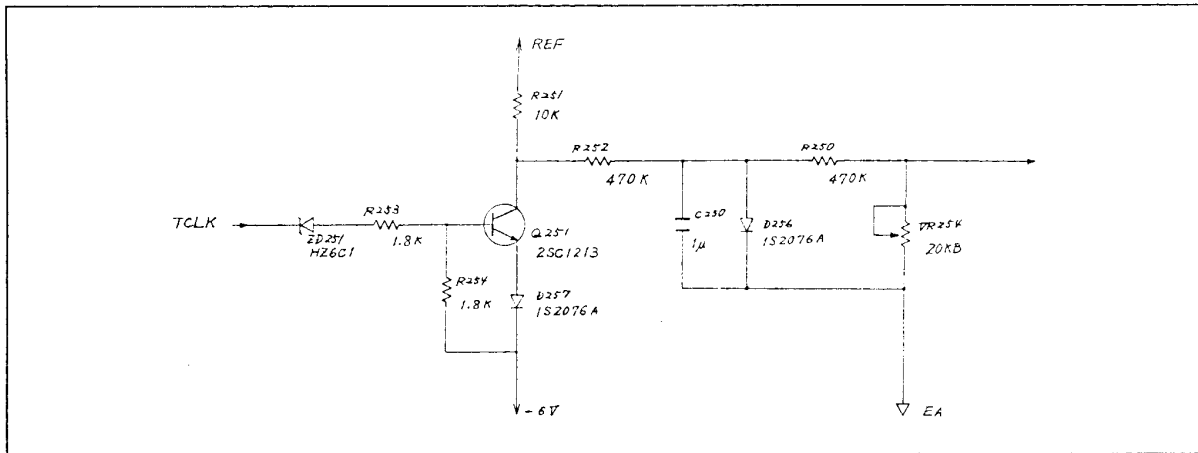
$$V_{pc} = 4.0 \times Z / (R381 + Z)$$

where Z : Impedance of paddle contact, T381, C381~382

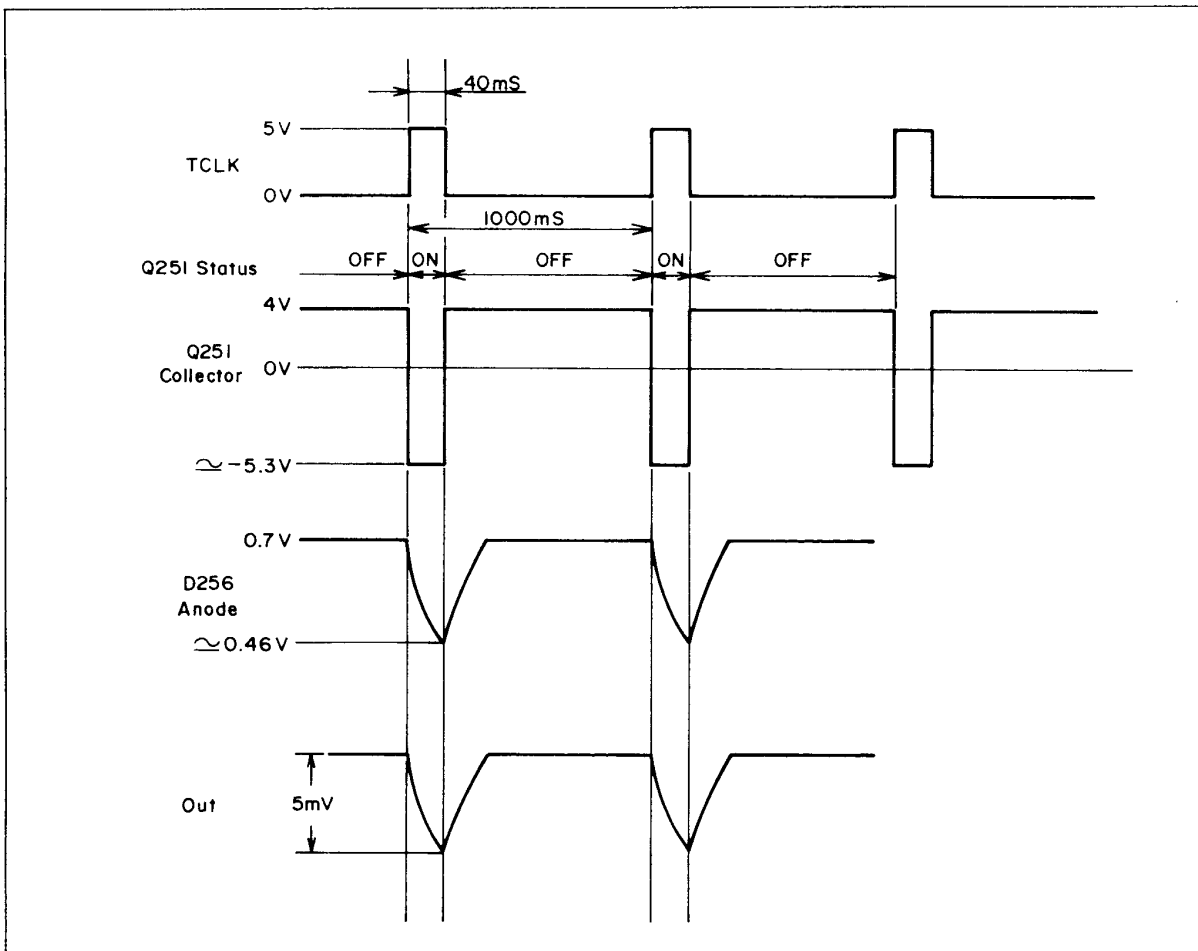
D381~382 protects IC381-1 from an excessive voltage caused by turning on of the external discharge relay when discharged without load. C384 cuts offset voltage. Offset voltage is added to IC381-2 through VR381 and R386 to obtain only paddle contact impedance from Z. IC381-2 smoothes the input and sends it to the A/D converter IC202. Paddle contact indicators on the paddle light in accordance with this value.

3. THEORY OF OPERATION

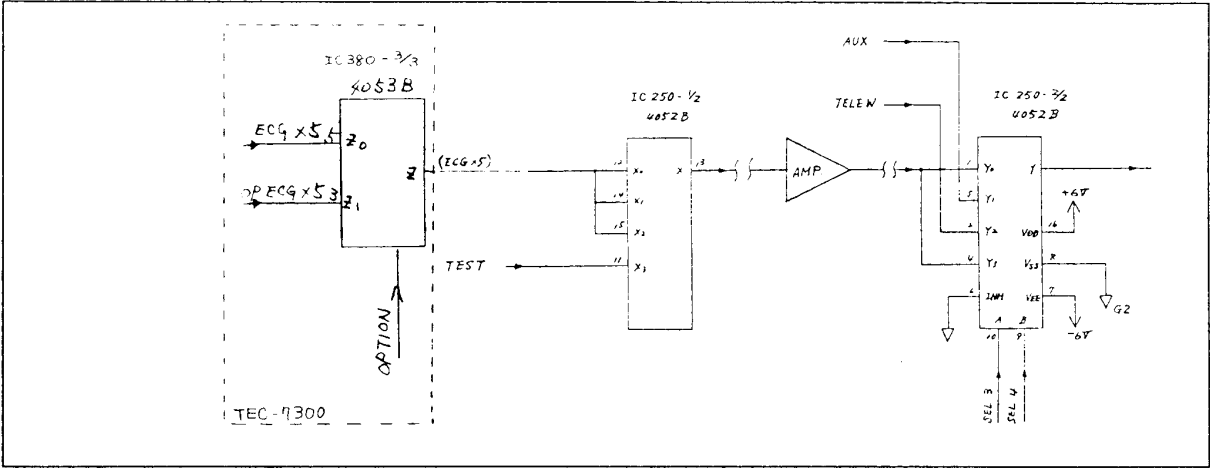
Test Waveform Generator



Charge and discharge of C250 controlled by TCLK generates the ECG simulated test waveform. The output voltage is adjusted to 5mVp-p with VR254.



Input Selector



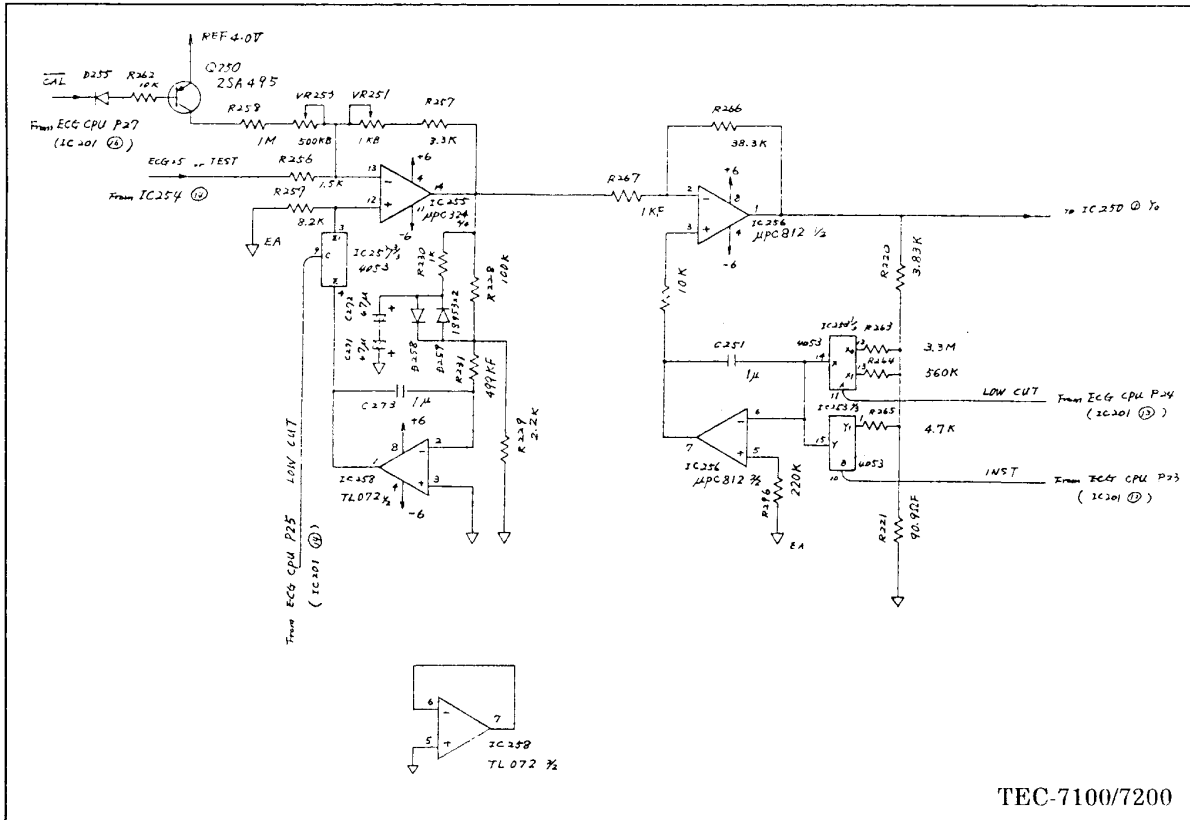
IC250-1 selects the ECG or test waveform and IC250-2 selects one from ECG/test, auxiliary and telemeter input. The circuit between the two input selectors is described later. The relationship between control signals and outputs is shown below.

Input Selection IC250

Select	Z	Select		X	Y	Output
		SEL3	SEL4			
0	Z0	0	0	X0	Y0	ECG
0	Z0	0	1	X2	Y2	TELE
0	Z0	1	0	X1	Y1	AUX
0	Z0	1	1	X3	Y3	TEST
1	Z1	0	0	X0	Y0	OPTION

3. THEORY OF OPERATION

Baseline Restorer, Time Constant and INST Control



Time constant selection of 0.32 and 3.2 sec. is controlled by two blocks : IC255-4, 258-1 and IC256. Both blocks are controlled by LOWCUT. Main function of IC255-4 and 258-1 is baseline restoring when energy is discharged. 3.2 sec. is selected only when the DIP switch on the side panel is set to the ECG position and the energy selector is set to the ECG/MON position. LOWCUT from the ECG CPU is high when 0.32 sec. is selected.

Baseline Restoring

This circuit quickly restores the saturated baseline due to a large polarization voltage caused by energy discharge. This circuit operates when a time constant of 0.32 sec. is selected (low level of LOWCUT turns on switch IC257-3). When the energy is discharged, the output of IC255-4 becomes much greater than usual, D258 or D259 turns on, and the gain of the high-cut filter IC258 becomes 30 times greater than usual as the output of IC255-4 is divided by R230 and R229. IC258-1 provides a large feedback to the amplifier IC255-4 to restore the baseline quickly. C271~272 do not allow a narrow pulse such as a pacing pulse to turn on D258~259.

Time Constant Selection

(1) Time constant of 3.2 sec.

As low level of LOWCUT turns off IC257-3 to disconnect the feedback amplifier IC258-1, IC255-4 functions only as an inverting amplifier. The output of IC256-1 is sent to the high-cut filter IC256-2 through R263 to feedback low frequency components.

(2) Time constant of 0.32 sec.

As a high level of LOWCUT turns on IC257-3, the time constant is determined by both blocks. Usually the output of the IC255-4 is several mV to several tens mV. As this level does not turn on D258~259, the input divided by R228 and R229 is sent to IC258-1. R230, D258~259 and C271~272 do not function. The output of IC256-1 is sent to the high-cut filter IC256-2 through R264.

INST Control

When the INST from the ECG CPU becomes high, switch IC253-2 turns on and R265 is selected to permit an extremely short time constant to reset the baseline. In the TEC-7300, switch IC257-2/3 also turns on to reset the baseline for the time constant control circuit of the previous stage.

Calibration Waveform Superimpose

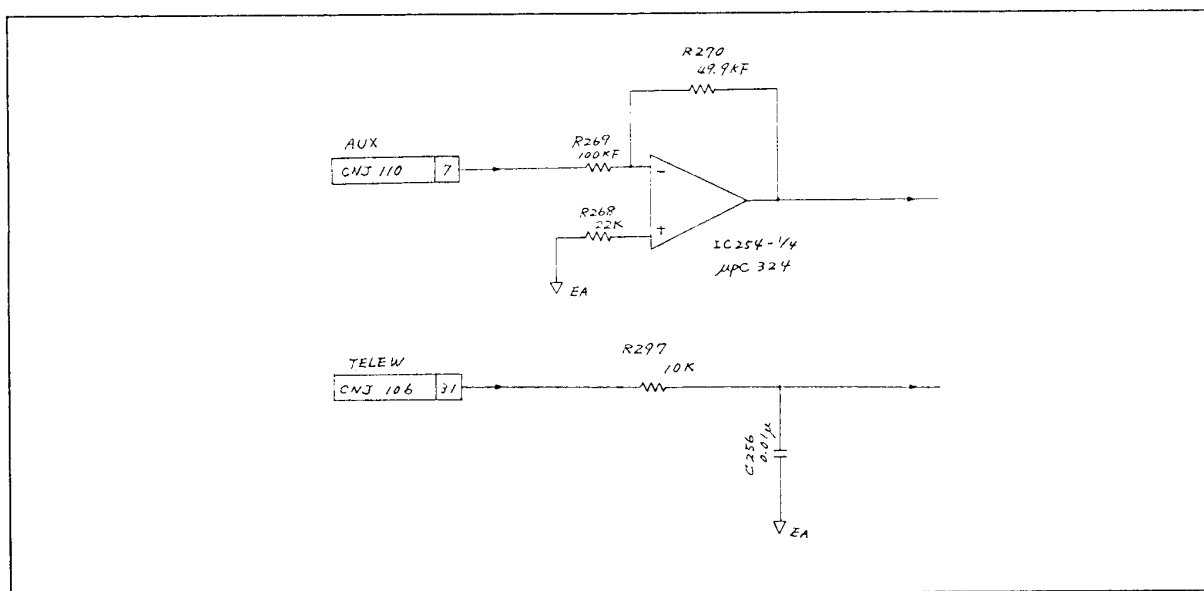
When the CAL from the ECG CPU becomes low, Q250 turns on to add the calibration to IC255-4.

Total Gain

The total gain of these circuits is adjusted with VR251 to 100 ($= (R257 + VR251) / R256 \times R266 / R267$).

3. THEORY OF OPERATION

External Inputs



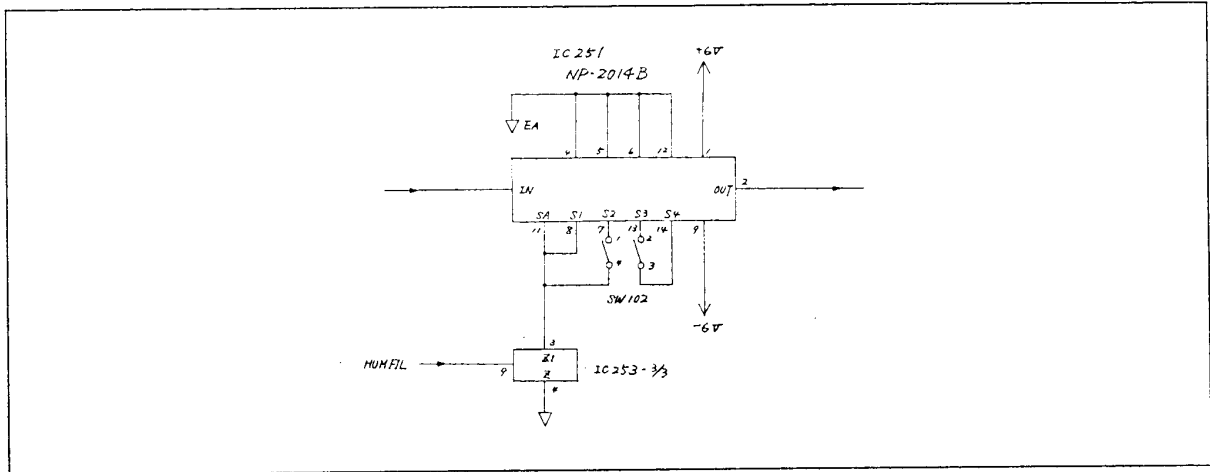
AUX

Auxiliary input of 1Vp-p is output as 1Vp-p at a sensitivity of $\times 1$. The gain of IC254 is 0.5.

TELEW

When the receiver is connected, the telemetry signal of inverted ECG of 0.5V/1mV appears as TELEW. The high-cut filter of 1.6kHz consists of R297 and C256.

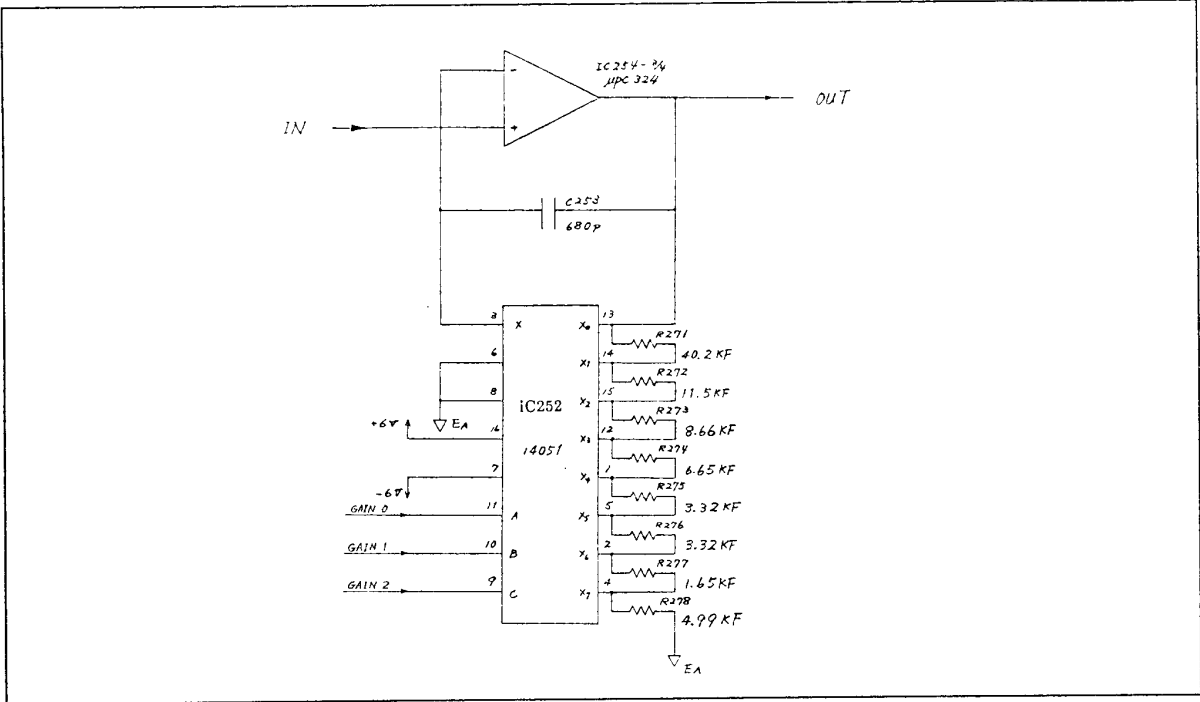
AC Filter



High level of HUMFIL turns on AC filter IC251. SW102 selects the frequency (ON: 60Hz, OFF: 50Hz).

3. THEORY OF OPERATION

Sensitivity Selection

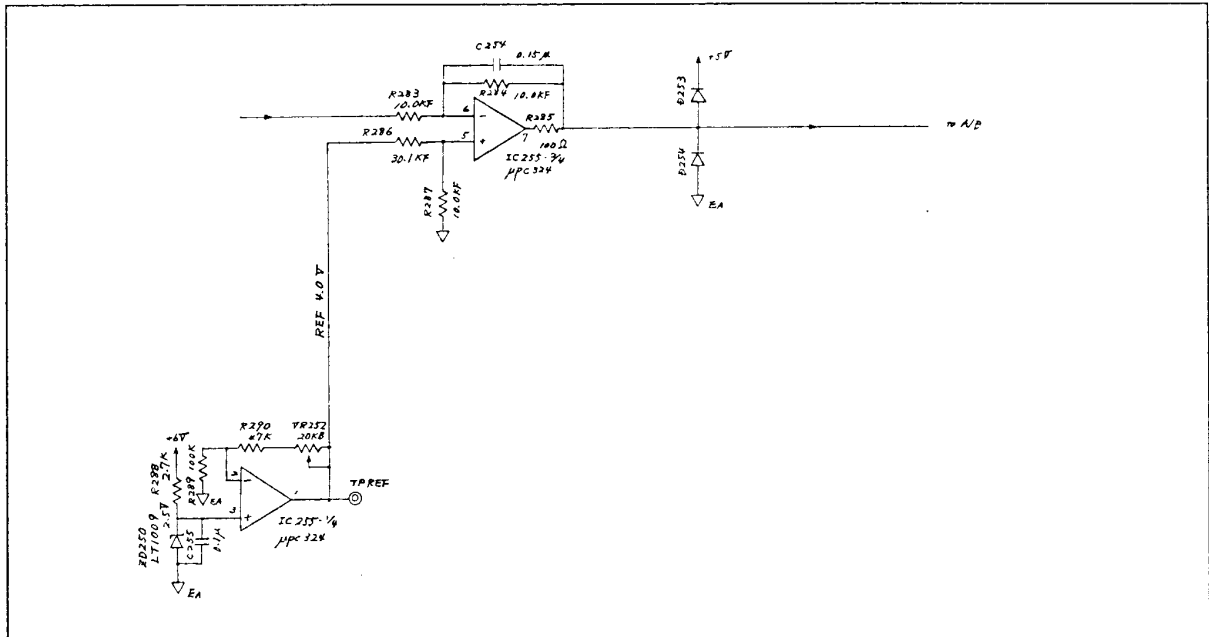


Sensitivity is selected by the multiplexer IC252. The input level of the selector is 0.125V/mV. Manual ($\times 0.5$, $\times 1$, $\times 2$, $\times 4$) and auto selection are available.

Sensitivity Selection IC252

Total Gain (V/mV)		Control			Selection	Output Sensitivity (V/mV)
Auto	Manual	GAIN 0	GAIN 1	GAIN 2		
----	----	0	0	0	X0	Not used
0.5	0.5	0	0	1	X1	0.25
0.7	----	0	1	0	X2	0.35
1	1	0	1	1	X3	0.50
1.5	----	1	0	0	X4	0.75
2	2	1	0	1	X5	1.0
3	----	1	1	0	X6	1.5
4	4	1	1	1	X7	2.0

ECG Analog Output



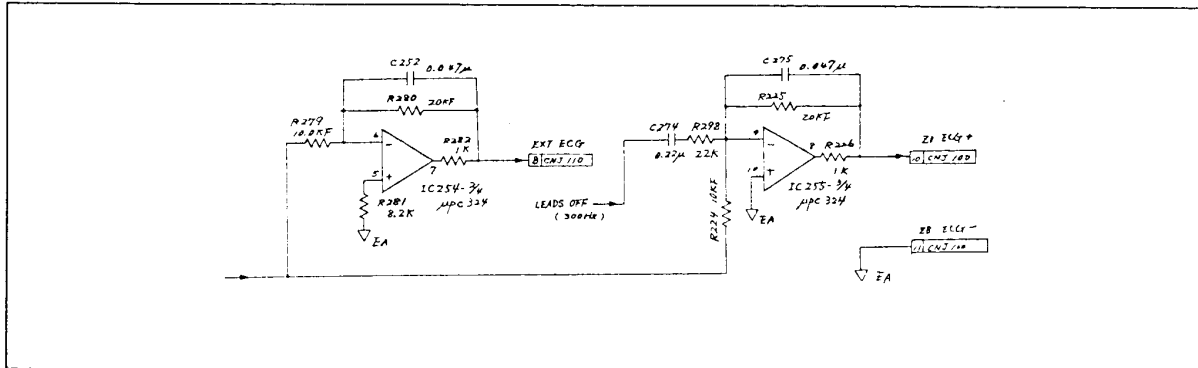
Reference Generator

IC255-1 supplies a regulated reference voltage of 4.0V. 2.5V of ZD250 is amplified by a factor of 1.6 to provide 4.0V.

High-cut Filter with Offset

IC255-2 is the high-cut filter of 100Hz with a gain of 1. The reference voltage of 4V is divided into 2V and added to IC255-2 as offset. This offset shifts the ECG signal range of $-2V \sim +2V$ to an A/D conversion range of $0 \sim +4V$.

External Outputs



External Output

IC254-2 is the high-cut filter of 170Hz with a gain of 2. The output level is 1V/1mV.

Telemeter Output

ZBECG signal is sent to the transmitter through the cable with attenuator for the central monitor. IC255-3 is the high-cut filter of 170Hz with a gain of 2. The output level is 1V/1mV. When leads-off is detected, a square waveform of 300Hz sent from the CRT CPU is added to IC255-3 through C274 to cut the DC component.

The ZB ECG signal attenuated to 1/1000 in the DIP SW board is outputted at the sensitivity of 1mV/1mV.

3-3-2 ECG CPU

Outline

The ECG CPU section controls :

ECG amplifier

Data transfer to / from the host CPU through the ECG CPU RAM

A/D conversion of the waveform, charge voltage, discharged energy, battery voltage, etc.

QRS detection

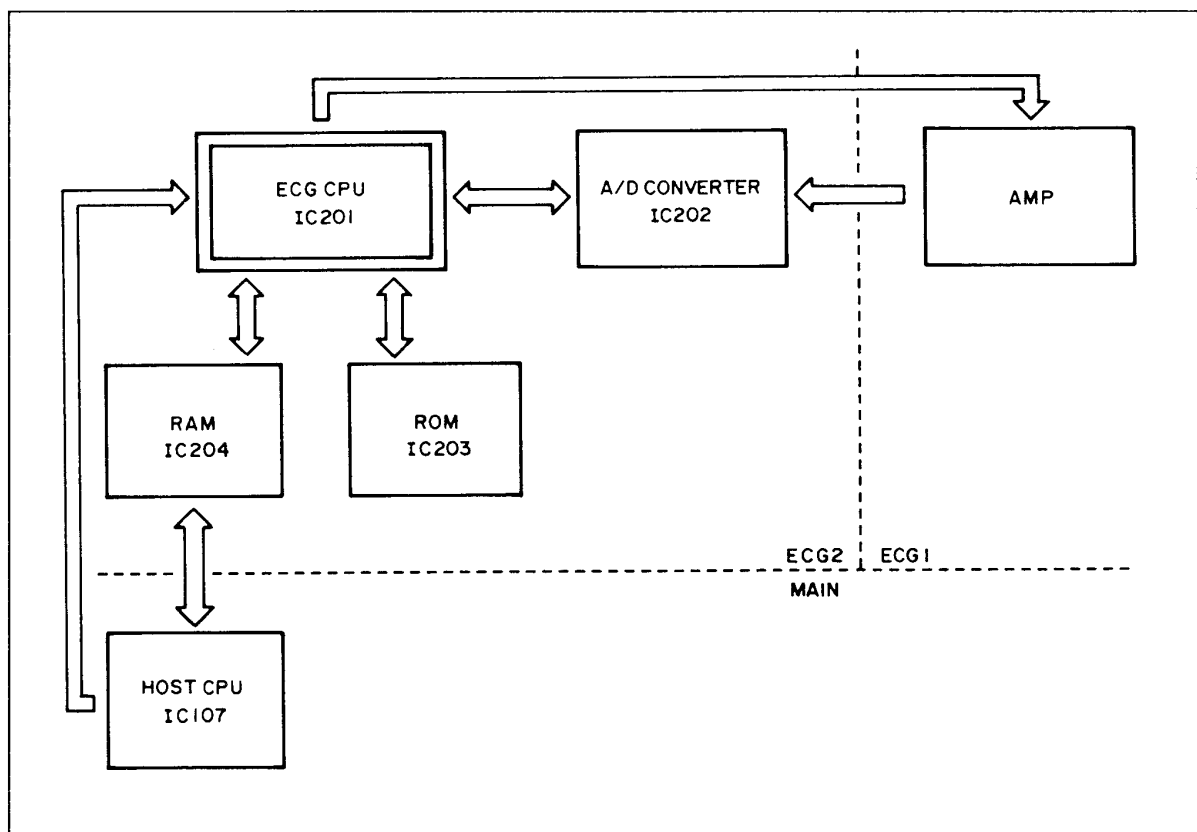
Heart rate count

VPC detection (TEC-7300 only)

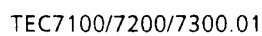
Communication with the pacing unit or interface unit (TEC-7300 only)

The ECG CPU operates on a 2MHz system clock (3MHz in TEC-7300) according to the program in the external ROM. The host CPU halts the CRT ECG every 2 msec. to transfer the data. After the data is transferred, the ECG CPU starts processing A/D converted data and the main routine.

ECG CPU and Peripheral Blocks



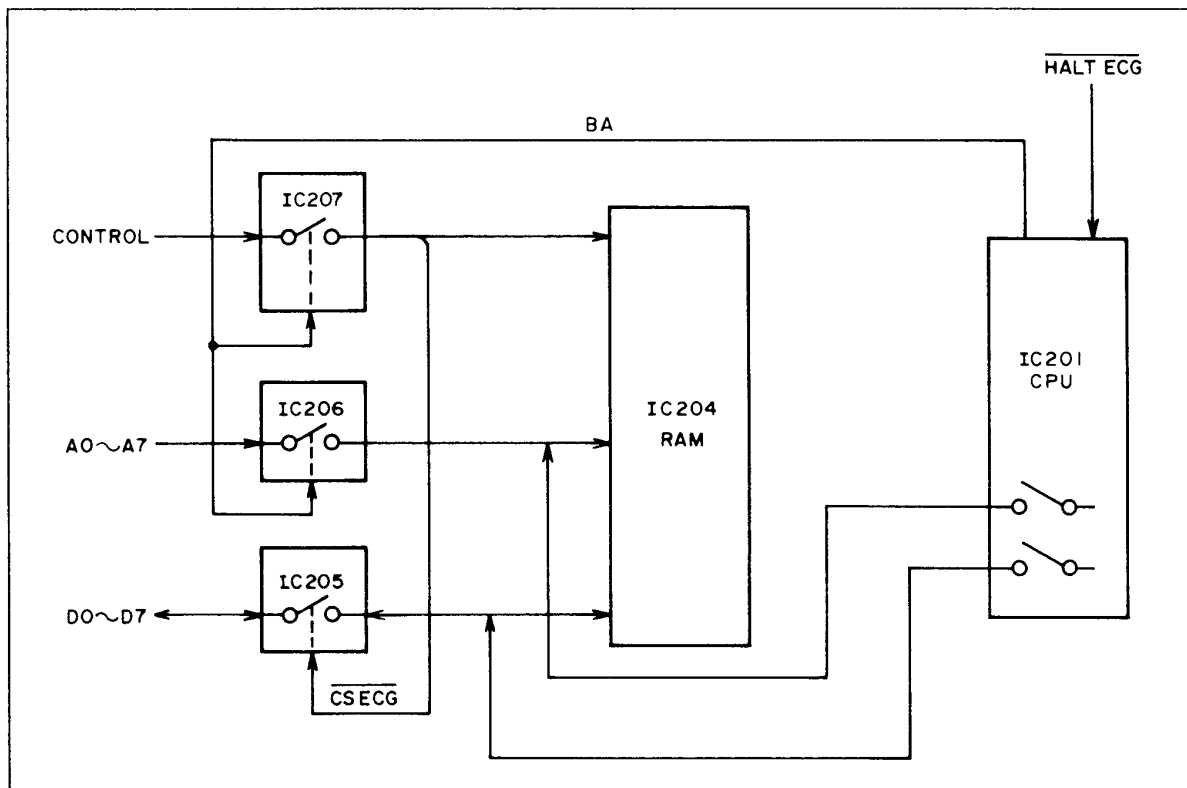
ECG CPU



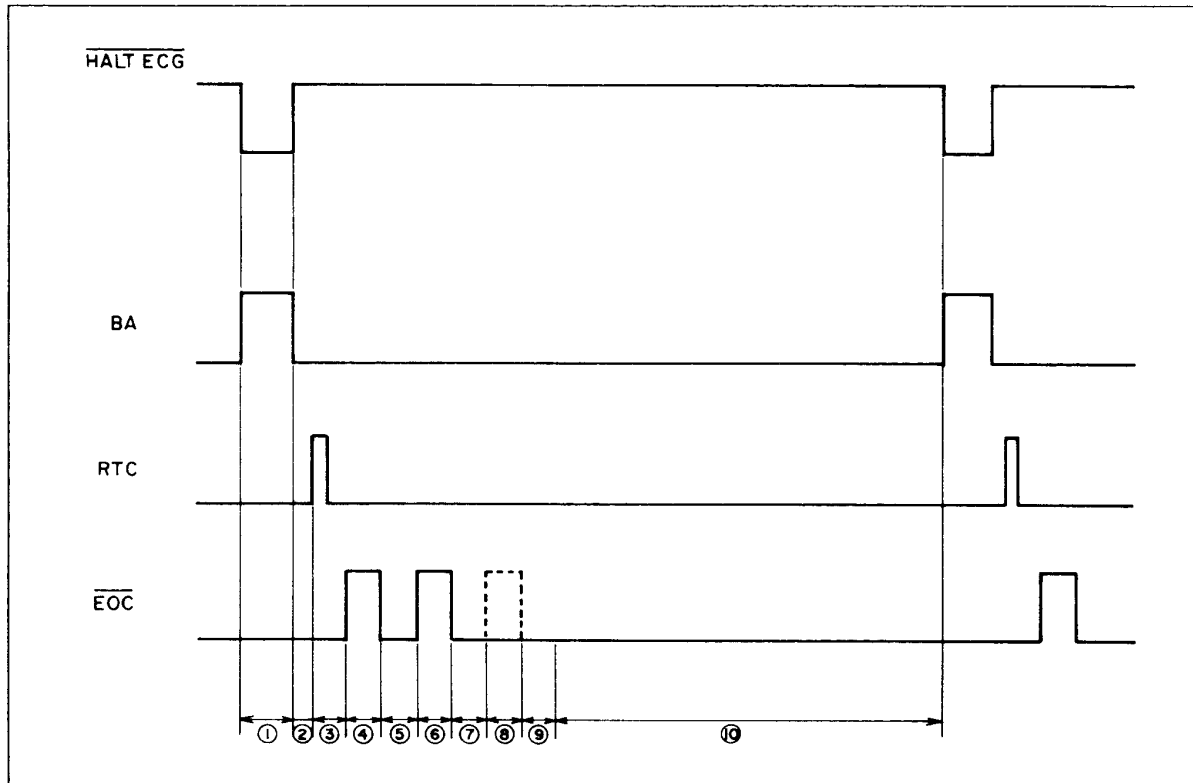
Communication with the Host CPU

Every 2 msec. the host CPU halts the ECG CPU IC201 and transfers the data to / from the ECG CPU RAM IC204. When HALTECG becomes low, the ECG CPU disconnects the bus line from itself and BA (bus available) becomes high to turn on the three-state buffer IC206~207 for the control and address bus. When the host CPU accesses the ECG RAM, CSECG becomes low to turn on the bi-directional three-state buffer IC205 for the data bus and to enable IC204 to access data. RD controls the transfer direction of the buffer.

ECG CPU Data Bus Control



Processing Cycle



RTC is an interrupt signal from the host CPU. During A/D conversion, the A/D converter IC202 outputs high EOC (End Of Conversion). The ECG CPU processing is shown below.

- ① Data is transferred from / to the host CPU to / from the ECG RAM
- ② Return to main routine executed before HALTECG interrupt
- ③ Processing for time constant, etc.
- ④ A/D conversion for the ECG waveform
- ⑤ QRS detection routine, etc.
- ⑥ A/D conversion for one of the following inputs :
 - CH1: Charged voltage
 - CH2: Paddle contact impedance
 - CH3: Battery voltage
 - CH4: Reference for discharged energy calculation

Above inputs are changed every RTC in the sequence of CH1→CH2→CH1→CH3→CH1→CH2→CH1→CH4.
- ⑦ Processing for A/D converted data of ⑥
- ⑧ Main routine, or A/D conversion for TTR after CH4 is converted only when the energy is discharged.
- ⑨ Main routine, or calculation of discharged energy when TTR is converted.
- ⑩ Main routine

ECG CPU Pin Description

Pin No.	Symbol	I / O	Function
1	Vss	---	Ground (ED)
2	XTAL	---	Not used
3	EXTAL	I	Clock 8 MHz (TEC-7100/7200), 12MHz (TEC-7300)
4~5	MP0~MP1	I	Operation mode selection — Mode 1 (MP0 : 1, MP1 : 0)
6	RST	I	Reset — 0 : Resets the CPU when the power is turned on.
7	STBY	I	Not used
8	NMI	I	Not used
9	P20	I	RTC — Clock pulse of 2 msec. from the host CPU
10	P21	O	TCLK (Test clock) — Clock pulse of 100 msec. for the test waveform (See Test waveform generator section)
11	P22	O	(TEC-7100/7200) HUMFIL (AC filter) — 1 : ON (TEC-7300) Serial communication clock
12	P23	O	(TEC-7100/7200) INST (Instantaneous trace reset) — 1 : ON (TEC-7300) Reception data of serial communication
13	P24	O	(TEC-7100/7200) LOWCUT (Time constant select) — (TEC-7300) 0 : 3.2 sec (Diagnosis), 1 : 0.32 sec (Monitor) Transmission data of serial communication
14	P25	O	(TEC-7100/7200) LOWCUT (Time constant select and ECG restorer) — 0 : 3.2 sec, restorer OFF, 1 : 0.32 sec, restorer (TEC-7300) ON Not used
15	P26	O	ECGCLK (ECG clock) — Modulation pulse of 50 kHz for ECG isolation.
16	P27	O	(TEC-7100/7200) CAL — 0 : Calibration appears. (TEC-7300) OPTION — 1 : ECG waveform is input from interface unit
17	P50	I	EOC (End of conversion) — 1 : During A / D conversion, 0 : End of A / D conversion
18	P51	I	ART (Artifact) — 0 : The electrode of a transmitter is detached.
19	P52	I	RCVFLT (Receiving fault) — 0 : A signal from a transmitter is not received.
20	P53	I	HALTECG — 0 : The host CPU halts the ECG CPU operation.
21	P54	I	LFAULT (Lead fault) — 0 : An electrode is detached.
22	P55	I	TELE (Telemeter) — 0 : The receiver is connected.
23	P56	I	CALL — 0 : Nurse call from the transmitter

3. THEORY OF OPERATION

Pin No.	Symbol	I / O	Function
24	P57	I	ZBB (ZB transmitter battery) — 0 : Battery level of the transmitter is low.
25~27	P60~P62	O	GAIN0~GAIN2 (Gain selection) — (See Gain Selector section.)
28~30	P63~P65	O	SEL1~SEL2 (Lead selection) — (See Lead Selector section.)
31~32	P66~P67	O	SEL3~SEL4 (Input selection) — (See Input Selector section.)
33	Vcc	I	Power — + 5 V
34~41	A15~A8	O	Address bus
42	Vss	---	Ground (ED)
43~50	A7~A0	I / O	Address bus
51~58	D7~D0	O	Data bus
59	BA	O	Bus available — 1 : The ECG CPU disconnects the bus when the ECG CPU halts.
60	LIR	---	Not used
61	R / W	---	Not used
62	WR	O	Write — 0 : Writes the data into the peripheral devices.
63	RD	O	Read — 0 : Reads the data from the peripheral devices.
64	E	O	ADCLK (A/D conversion clock) — 2 MHz (TEC-7100/7200) 3 MHz (TEC-7300)

3-3-3 HOST CPU (Main Section with UP-7638 Front Panel Board)

Outline

The host CPU section controls :

Data transfer to/from ECG CPU, CRT CPU and recorder

Key entry recognition

LED and speaker control

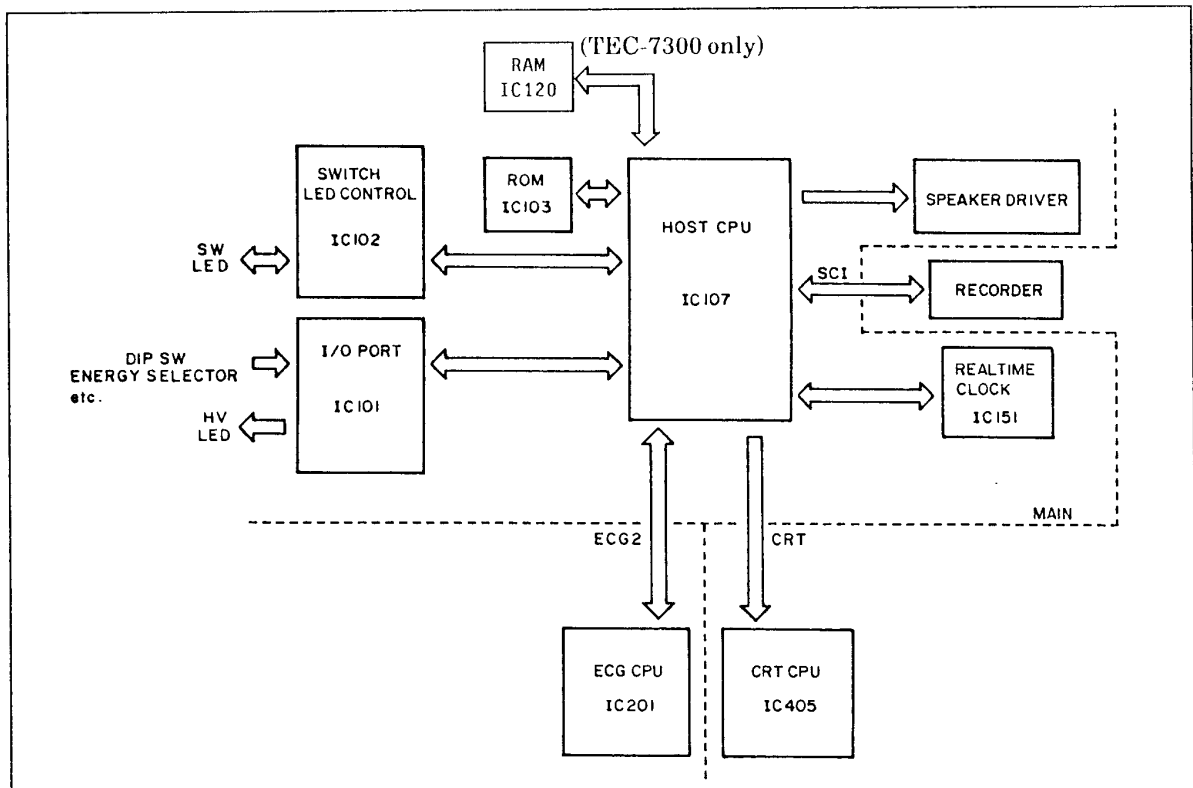
High voltage control

Time measurement

VPC recall waveform control (TEC-7300)

The host CPU operates on 2MHz (3MHz in TEC-7300) system clock according to the program in the ROM. The host CPU halts the ECG CPU every 2 msec. and the CRT CPU every 24 msec., and sends serial data directly to the recorder. Keyboard/display inter-face monitors key entry and controls the LED display. I/O port reads DIP switch status data and controls the high voltage unit. If the host CPU runs away, the regularly generated pulse is lost and the CPU is reset by the runaway detector.

Host CPU and Peripheral Blocks



3. THEORY OF OPERATION

Host CPU

An 8 bit micro-processing unit 63B03X IC107 includes a 192 byte RAM, programmable timers, a serial communication interface and uses 19 line I/O ports. The crystal oscillator X100 provides a clock of 8MHz (12MHz in TEC-7300) to IC107.

Host CPU Pin Description

Pin No.	Symbol	I / O	Function
1	Vss	---	Ground
2	XTAL	---	Not used
3	EXTAL	I	Clock 8 MHz (TEC-7100/7200), 12MHz (TEC-7300)
4~5	MP0~MP1	I	Operation mode selection — Mode 1 (MP0 : 1, MP1 : 0)
6	RES	I	Reset — 0 : Resets the CPU when the power is turned on.
7	STBY	I	Not used
8	NMI	I	Non-maskable interrupt — Negative edge causes restart from start address. When RTC signal is lost by program runaway, IC106 outputs "L" NMI.
9	P20	O	QRS sync sound — 1 : ON (for 100 msec.)
10	P21	O	Charge completion sound — 1 : ON
11	P22	O	PRTCLK (Printer clock) — Clock pulse for printer
12	P23	O	Charge LED — 1 : Off or flash, 0 : Lit
13	P24	O	SIN — Serial data synchronized with clock pulse for printer
14	P25	O	Alarm sound — 1 : ON
15	P26	O	Clock — 15.4 kHz for beeps
16	P27	O	STB (Strobe) — 1 : Strobes the thermal head to latch one block data (384 bits).
17	P50	I	IRQ (Interrupt request) — 0 : Sent from Key / LED interface when a key is pressed.
18~20	P51~P53	---	Not used
21	P54	I	OVERCHG (Over charge) — 1 : Overcharge, charge is stopped.
22	P55	I	NO PAPER — 0 : Paper is used up. Absence of paper is indicated by repeated occurrence of this signal.
23	P56	O	AC — 1: AC power source, 0 : DC power source

Pin No.	Symbol	I / O	Function
24	P57	O	DCHGCHK (Discharge check) — 0 : While the energy is discharged to terminals in the paddle housing for discharge test.
25	P60	O	BATTOFF — 1 : Turns off battery power source
26	P61	O	HALTCRT — 0 : Halts the CRT CPU to transfer the data to the RAM of CRT CPU.
27	P62	O	RTC : Clock pulse of 2 msec.
28	P63	O	HALTECG — 0 : Halts the ECG CPU to transfer the data to / from the RAM of ECG CPU.
29	P64	O	TTRRST (TTR reset) — 1 : Resets the integrator of TTR measurement.
30	P65	---	(TEC-7100/7200) Not used (TEC-7300) DISPSEL — 0 : When the DISPLAY key is pressed.
31	P66	I	(TEC-7100/7200) Sync one time — 0 : Sync mode is released to (TEC-7300) ASYNC mode auto-matically when the energy is discharged. Not used
32	P67	---	(TEC-7100/7200) Not used (TEC-7300) Bank selection for RAM IC120
33	Vcc	I	Power — + 5 V
34~41	A15~A8	O	Address bus
42	Vss	---	Ground (ED)
43~50	A7~A0	O	Address bus
51~58	D7~D0	I / O	Data bus
59	BA	---	Not used
60	LIR	---	Not used
61	R / W	---	Not used
62	WR	O	Write — 0 : Writes the data into the peripheral devices.
63	RD	O	Read — 0 : Reads the data from the peripheral devices.
64	E	O	(TEC-7100/7200) Clock pulse of 2 MHz for the Key / LED interface. (TEC-7300) Not used

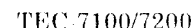
3. THEORY OF OPERATION

I/O Port Pin Description

Pin No.	Symbol	I/O	Function
1~4	PA3~PA0	I	Energy selector position code (See Energy Select section.)
5	RD	I	Read — 0 : The host CPU reads the data or status.
6	CS	I	Chip select — 0 : Selected
7	GND	---	Ground
8~9	A1~A0	I	Port selection (See host CPU address bus section.)
10	PC7	O	EXTRLY* (External discharge relay) — 1 : ON
11	PC6	O	INTRLY* (Internal discharge relay) — 1 : ON
12	PC5	O	CHGON* (Charge on) — 1 : Energy charging starts. * : EXTRLY, INTRLY and CHGON signals are disabled by RST for power-on transit times.
13	PC4	O	REC (Record) — 1 : Recorder starts.
14	PC0	O	LEDRED (Paddle contact red LED) — 1 : ON
15	PC1	O	LEDYEL (Paddle contact yellow LED) — 1 : ON
16	PC2	O	LEDGR (Paddle contact green LED) — 1 : ON
17	PC3	O	CLAMP (Energy charging lamp) — 1 : Lit or OFF, 0 : Flash
18	PB0	I	DIP0 = Time constant — 0 : ECG (3.2 sec.), 1 : Monitor (0.32 sec.)
19	PB1	I	DIP1 = AC filter — 0 : ON
20	PB2	I	DIP2 = Alarm recoding mode — 0 : ON
21	PB3	I	DIP3 = Automatic recording — 0 : ON
22	PB4	I	Not used
23	PB5	I	DIP5 = 3/5-electrode method — 0 : 5 electrodes (P, I, II, III, aVR, aVL, aVF, V, AUX, TELE, TEST) 1 : 3 electrodes (P, I, II, III, TEST)
24	PB6	I	DIP6 = Recording mode — 0 : Realtime, 1 : Delay
25	PB7	I	DIP7 = Paddle sync — 0 : Available
26	Vcc	I	Power — +5V
27~34	D7~D0	I/O	Data bus
35	RST	I	Reset : Grounded to avoid reset by noise
36	WR	I	Write — 0 : The CPU writes the data or control words.
37	PA7	I	CNTL — 0 : ↑ Key is pressed.

Pin No.	Symbol	I / O	Function
38	PA6	I	EXDCHG (External paddle discharge) — 0 : Paddle discharge switches are pressed. Key / LED interface IC102 also monitors this signal to improve reliability.
39~40	PA5~PA4	I	Paddle type (PA 4, PA 5) — (0, 1) : External paddle (1, 0) : Internal paddle (1, 1) : No paddle

Key Entry (UP-7638)



Key status is sensed by key/display interface IC102. IC102 has key entry recognition and LED display control function. IC102 generates scan signal S0~S3 to the key matrix connected to UP-7638 front panel board and recognizes the key pressed by return signal R0~R2. While a key is pressed, other key entries are ignored (2-key lock-out mode). For example, when SL1 becomes low while the FREEZE key is pressed, RL0 also becomes low and IC102 recognizes key entry. Other keys are recognized as shown below.

	RL0	RL1	RL2
SL0	DISCHARGE	CHARGE	SYNC
SL1	FREEZE	↓ (TEC-7100/7200) SELECT (TEC-7300)	----
SL 2	HI / LO LIMITS	ALARM ON/OFF	SENS
SL 3	LEAD	REC / STOP	----

TEC7100/7200/7300.01

When pressed, IRQ of IC102 (4) becomes high to request an interrupt to the host CPU IC107 (17). After IC107 reads all key data in the FIFO of IC102, IC102 clears the IRQ. The E of IC107 (64) provides the clock pulse 79CLK of 2MHz to IC102.

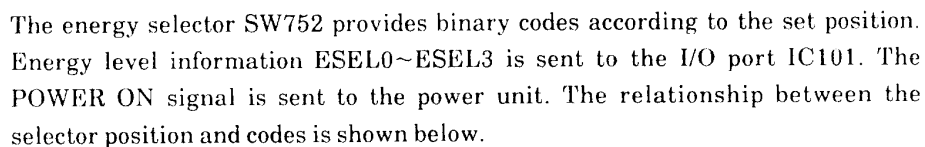
The ↑ key is the only key which is not recognized by IC102 but by the I/O port IC101 because the time setting mode requires pressing two keys (↑ and ALARM ON/OFF) at the same time. When the ↑ key and the other key are depressed, C/S of IC102 (37) becomes low and the other key pressed will select the other function.

Paddle Charge / Discharge

When the paddle charge button is pressed, EXCHG of CNJ157 (16) becomes low. If S0 also becomes low at the same time, R1 becomes low. This condition is the same as if the CHARGE key on the front panel had been pressed.

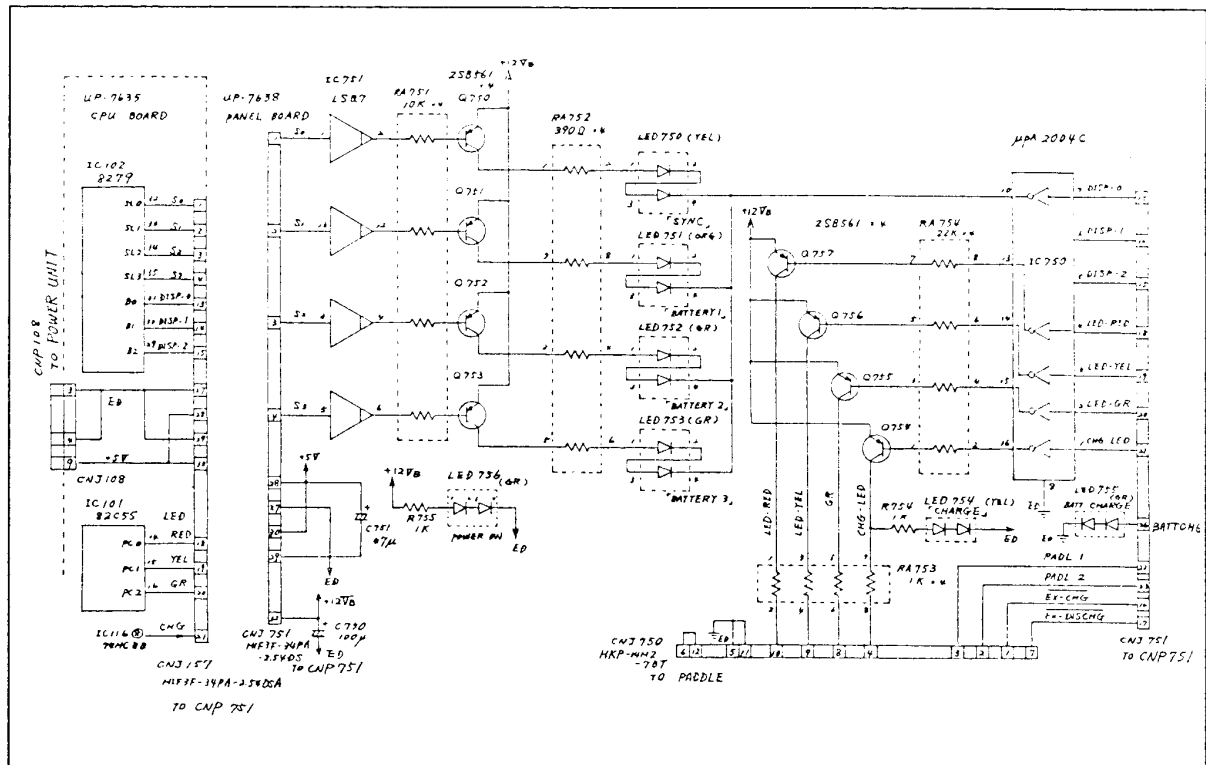
When the paddle discharge buttons are pressed, EXDICHG of CNJ157 (17) becomes low and similarly the DISCHARGE key is recognized.

Energy Selection



Position	Terminal				
	1	2	3	4	6
1 (MON/ECG)	0	0	0	0	0
2 (3J)	1	0	0	0	0
3 (5J)	0	1	0	0	0
4 (10J)	1	1	0	0	0
5 (20J)	0	0	1	0	0
6 (50J)	1	0	1	0	0
7 (70J)	0	1	1	0	0
8 (100J)	1	1	1	0	0
9 (150J)	0	0	0	1	0
10 (200J)	1	0	0	1	0
11 (300J)	0	1	0	1	0
12 (360J)	1	1	0	1	0
13 (30J)	0	0	1	1	0
18 (OFF)	1	0	0	0	1

LED Display (UP-7638)



Symbol	Color	Name	Operation
LED750	Yellow	SYNC	Lit in SYNC mode.
LED751	Orange	BATTERY 1	Depends on the battery level.
LED752	Green	BATTERY 2	Depends on the battery level.
LED753	Green	BATTERY 3	Depends on the battery level.
LED754 D050	Yellow	CHARGE	Flashes during energy charging. Lit when energy charge is completed.
LED755	Green	BATT CHG	Lit during battery charging.
LED756	Green	POWER ON	Lit while the power is on.
D051	Green	GOOD	Paddle contact impedance : $\leq 100\Omega$
D052	Yellow	----	Paddle contact impedance : $100\sim 200\Omega$
D053	Orange	POOR	Paddle contact impedance : $\geq 200\Omega$

LEDs on the front panel and the paddle are controlled by the host CPU, I/O port, key/LED interface and power unit, etc. The function of each LEDs is listed above.

3. THEORY OF OPERATION

SYNC and BATTERY LEDs LED750~LED753

These LEDs are controlled by scan lines S0~S3 and DISP-0 signal of the key/LED interface IC102. For example, when S1.0 becomes low and DISP-0 becomes high, LED750 lights.

BATT CHG LED LED755

When the battery is charged, battery charging voltage BATTCHG is applied to LED755 through the battery detector switch.

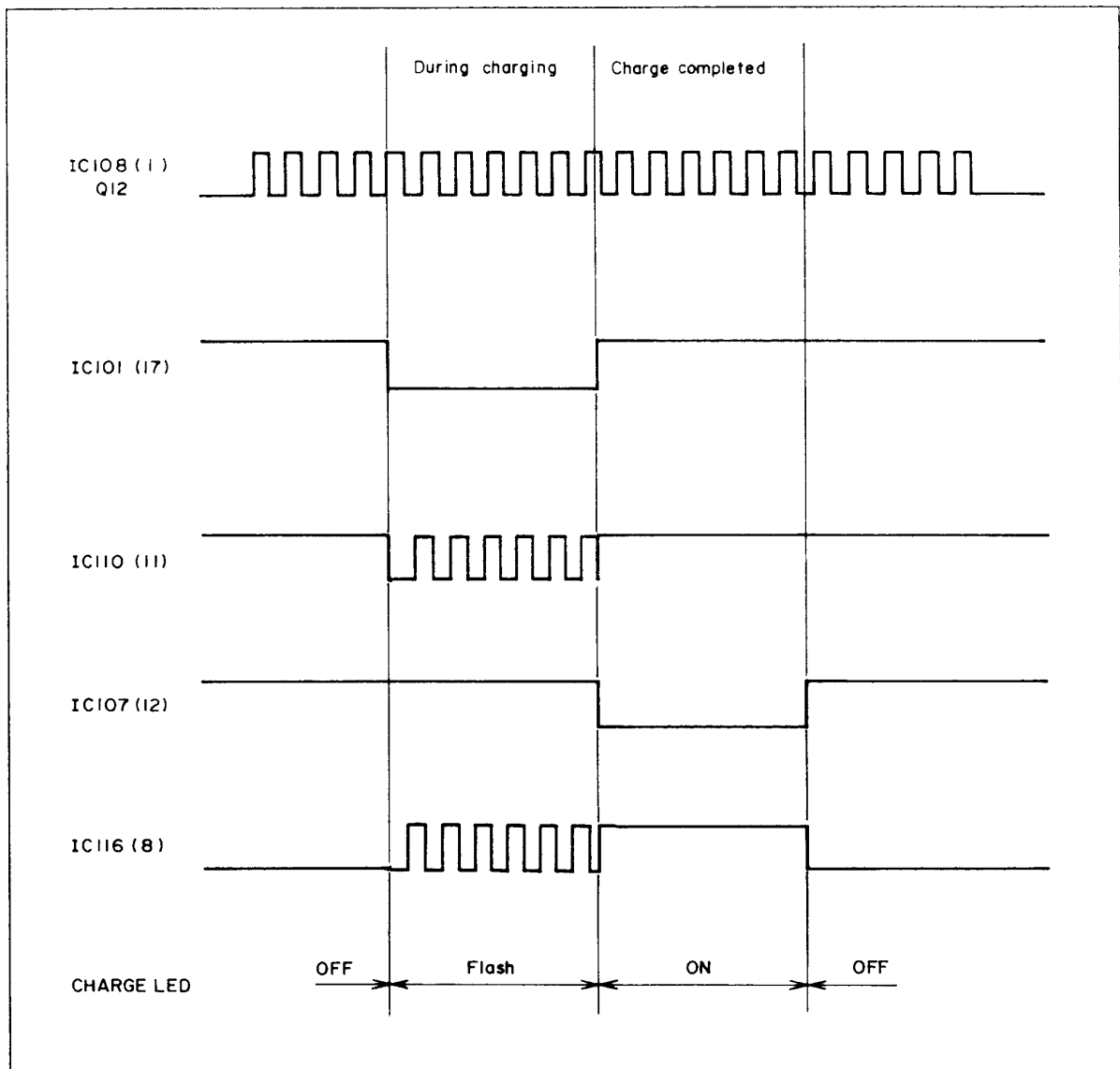
POWER ON LED LED756

When the power is turned on, +12V is supplied and the LED lights

PADDLE CONTACT LED LED051~LED053 (TEC-7200 only)

The I/O port outputs high to one of LEDRED, LEDYEL and LEDGR (IC750 ④~⑥) depending on the paddle contact impedance.

Charge LED Control Timing



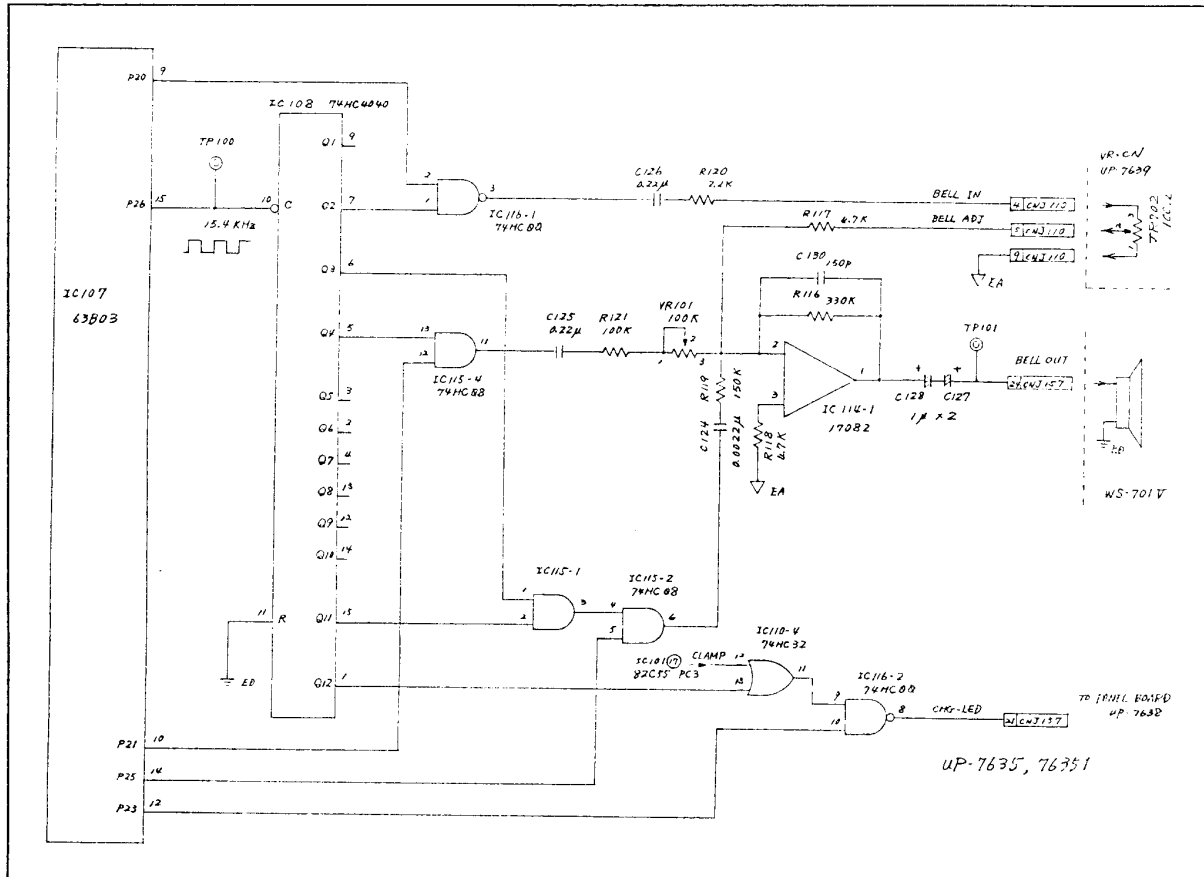
CHARGE LED LED754, LED050

(See the circuit shown in Sound Control section)

When energy charging starts, CLAMP of the I/O port IC101 (17) becomes low to enable the OR gate IC110-4 (11) to output a square waveform of 3.8Hz from the frequency divider IC108 (1). CHGLED of NAND gate IC116 (8) flashes LED754 on the front panel and LED050 on the external paddle until charging is completed. When charging is completed, P23 of the host CPU IC107 (12) outputs low, CHGLED becomes high and the LED lights steadily. When the energy is discharged, IC107 (12) becomes high and the LED goes off.

Sound Control

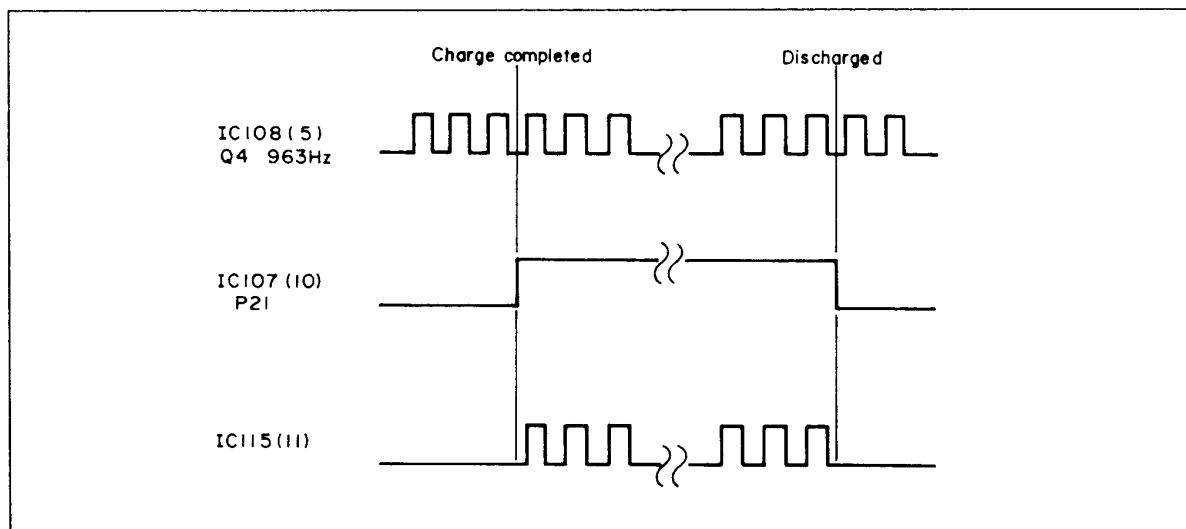
Sound and CHARGE LED control



Energy Charge Completion Sound

When the energy charge is completed, P21 of IC107 (10) becomes high and a square waveform of approx. 963Hz is generated at Q4 of the frequency divider IC108 (5). A sound of 963Hz is emitted until the energy is discharged.

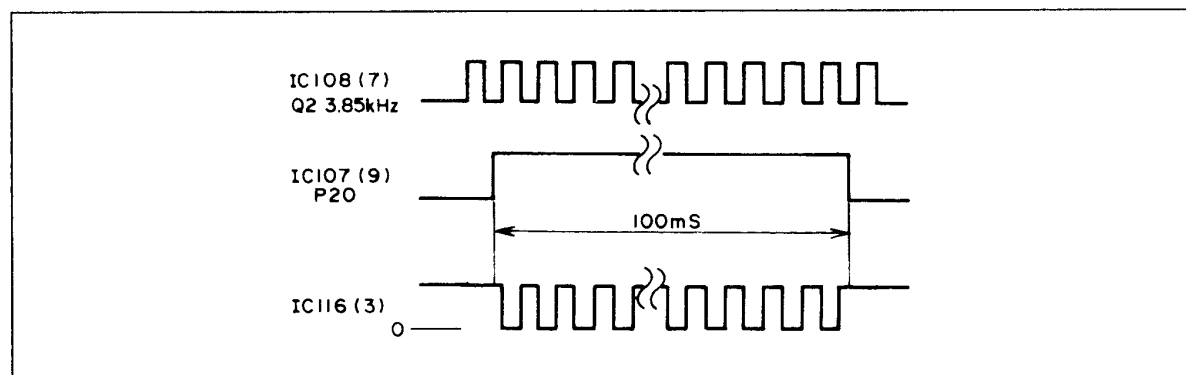
Charge Completion Sound Control Timing



QRS Sync Sound

P20 of IC107 (9) becomes high in synchronization with the QRS. Q2 of IC108 (7) constantly provides a square waveform of 3.85kHz. The sound of 3.85kHz is emitted for 100 msec. in synchronization with the QRS.

Sync Control Timing



3. THEORY OF OPERATION

Alarm Sound

According to the cause of alarm, the alarm sounding time is determined as follows :

Sound is emitted for 3 sec.

NG (TEST AT 50J)

PAPER EMPTY

ERROR 1~4

Sound continues

LOW BATTERY

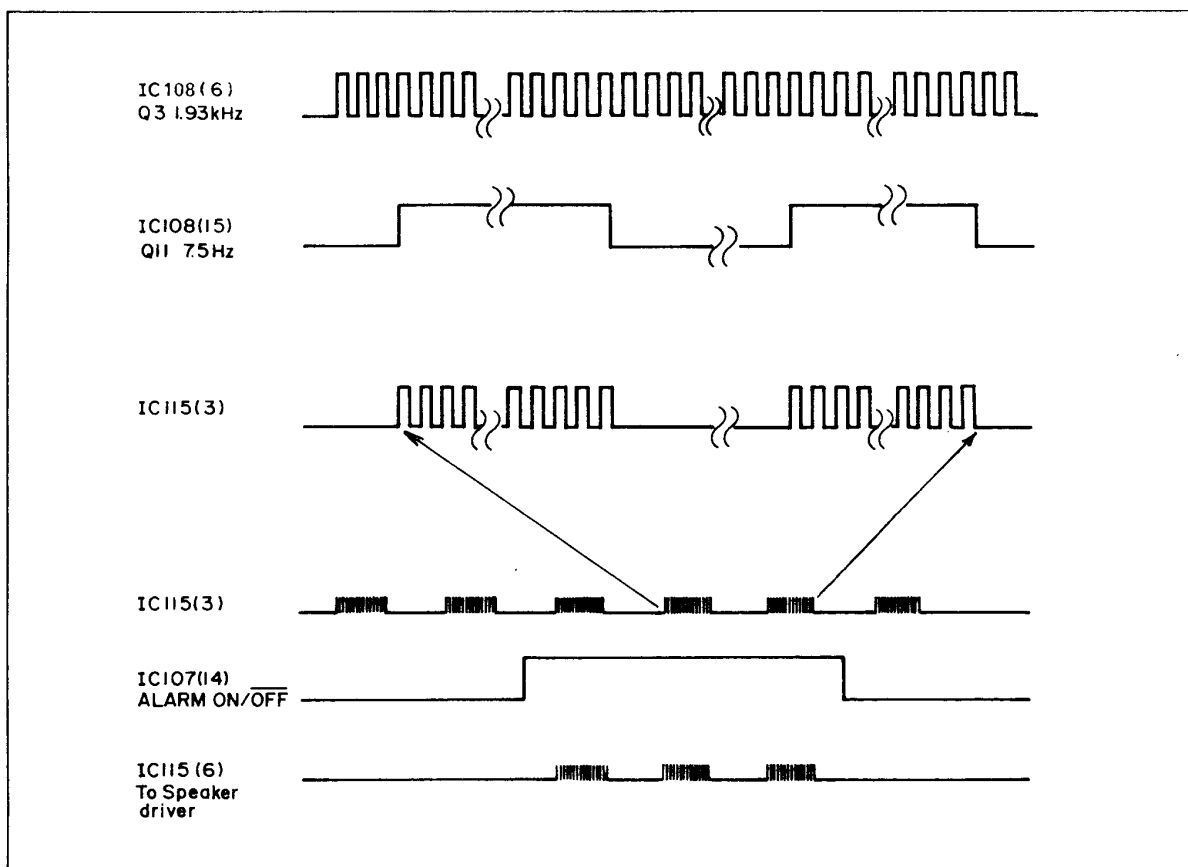
NURSE CALL (When using a transmitter)

SIGNAL LOSS (When using a transmitter)

When heart rate exceeds the limits

A square waveform of 1.93kHz at Q3 of IC108 (6) and that of 7.5Hz at Q11 of IC108 (15) provides an intermittent sound. While P25 of IC107 (14) outputs high, a sound is emitted.

Alarm Sound Control Timing



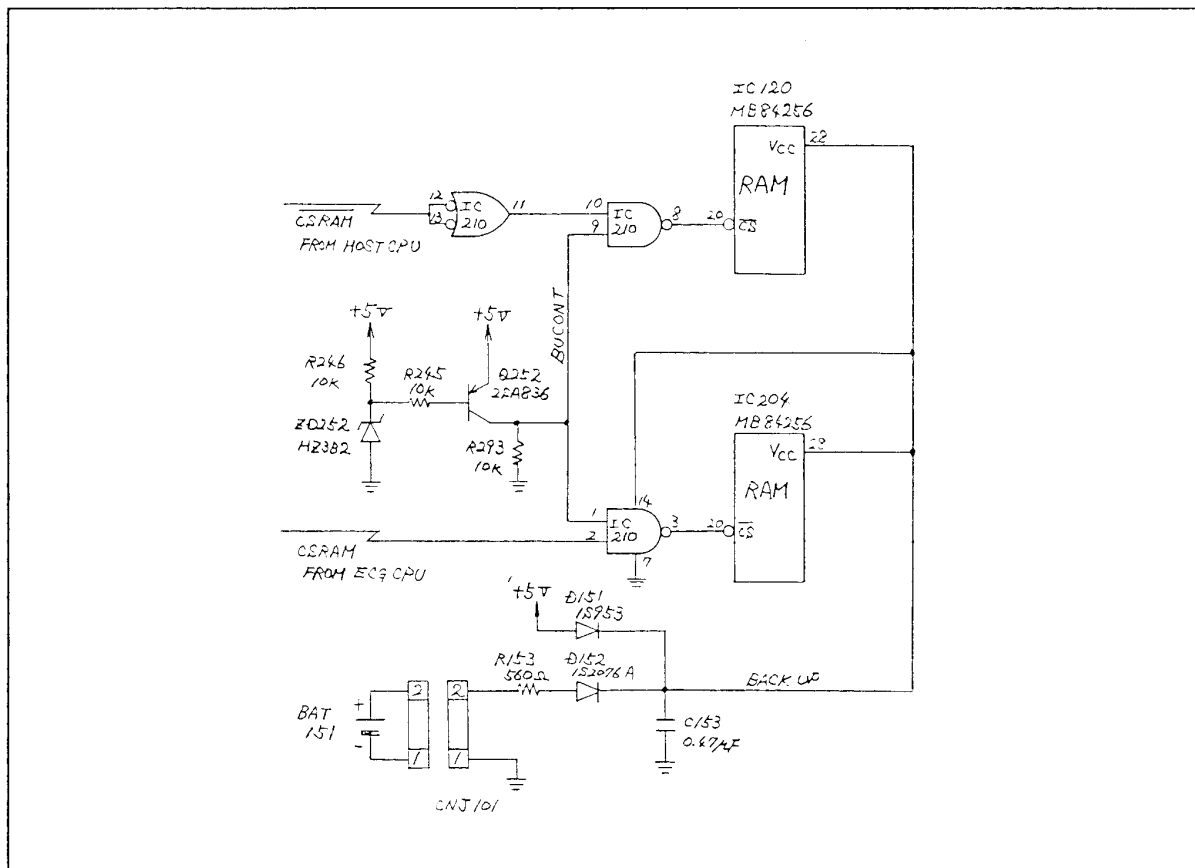
Speaker Driver

IC114-1 amplifies pulses from the above circuits to drive the speaker. C127 and C128 cut DC components of the signal. VR702 on the UP-7639 VR and a connector board adjust the sync sound volume. VR101 adjusts charge completion sound volume.

RAM Data Backup (TEC-7300 only)

The battery BAT151 provides backup for RAMs. The higher of the two voltages of +5V and BAT151 is selected by D151 and D152. When the power is off or the supply voltage of +5V is less than approx 4V, the BUCONT signal is low and $\overline{CS}$ of the RAMs becomes high to prevent noise from appearing in the data.

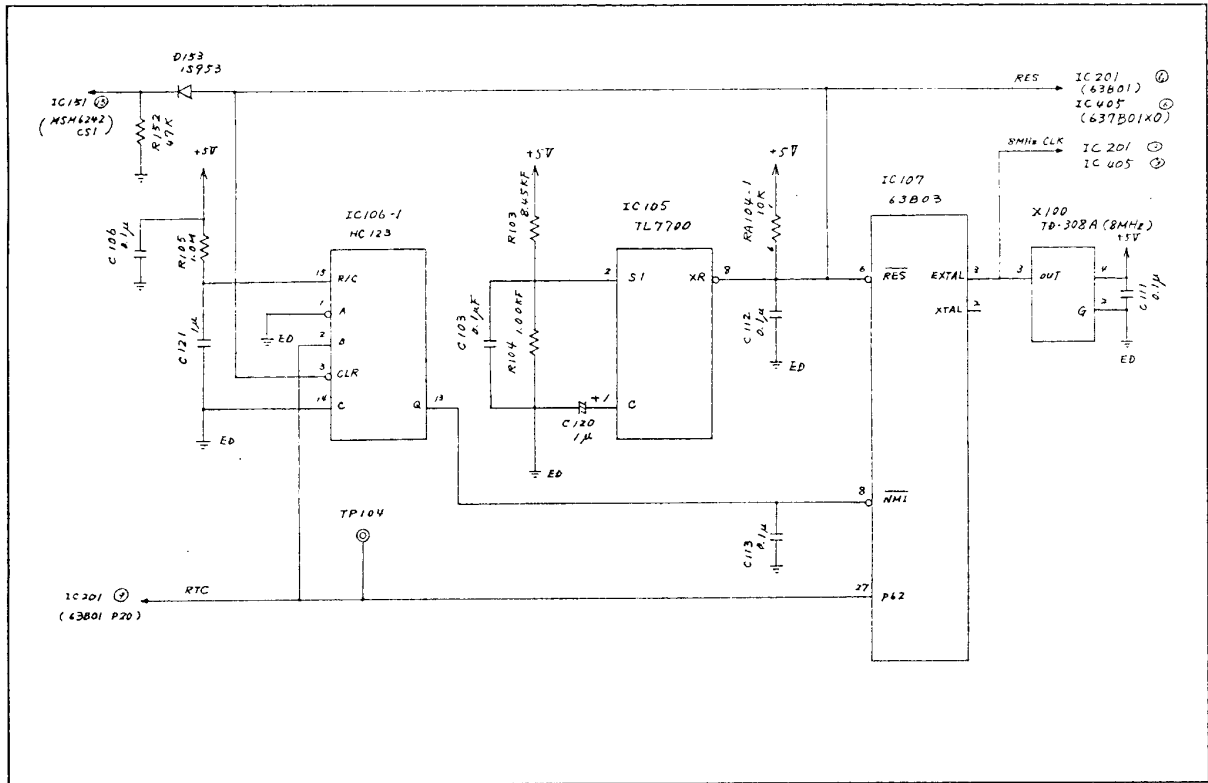
RAM Data Backup



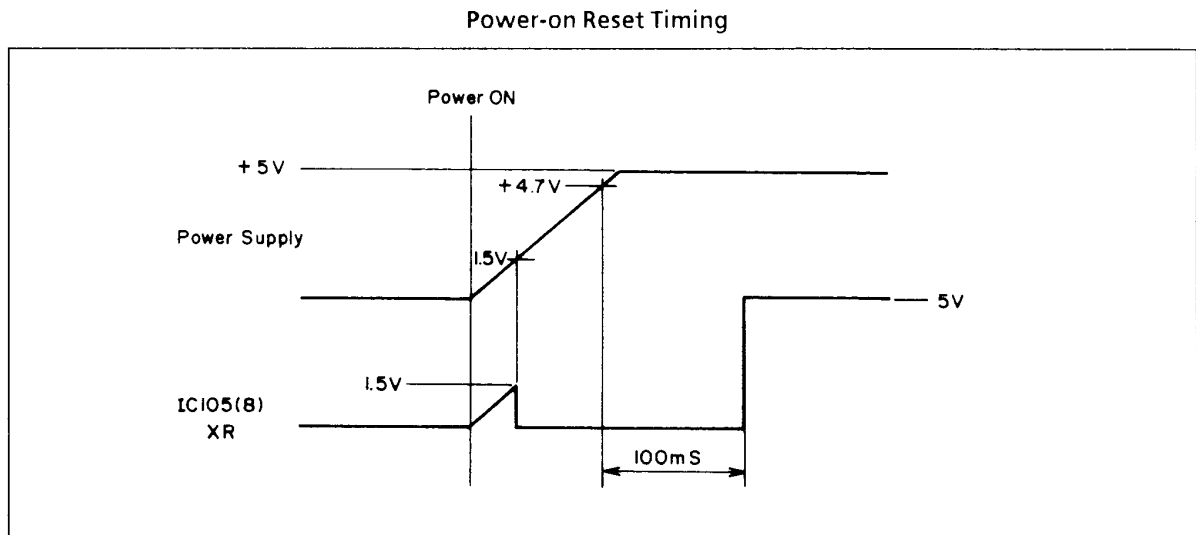
3. THEORY OF OPERATION

Power-on Reset

Power-on Reset and Runaway Detection



The voltage monitor IC105 monitors the power supply voltage and resets CPUs until the voltage reaches a steady state when turning on the power. After the power is turned on, the voltage reaches 1.5V in transit, IC105 starts operating and XR (open collector out) of IC105 (8) turns on. RES (reset) of IC107 becomes low and IC107 is reset. XR is kept low until 100 msec. after the power supply voltage reaches 4.7V. The waiting time of 100 msec. is determined by C120 which is charged by IC105 (1). RES pulse also resets the ECG CPU IC201 and CRT CPU IC405.

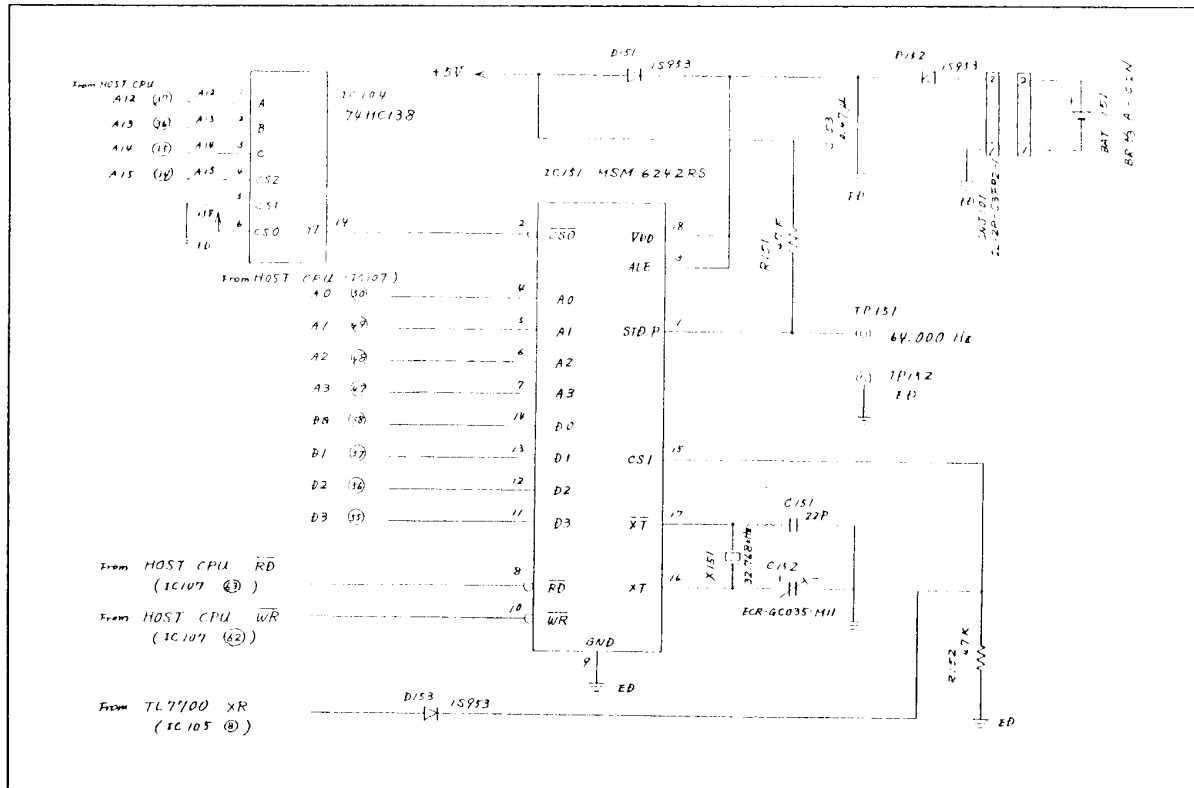


Runaway Detection

IC107 (27) constantly generates a clock pulse RTC of 2 msec. Re-triggerable monostable multivibrator IC106 (13) Q outputs a pulse of 1 sec. determined by the product of C121 (1 μ F) and R105 (1M Ω) when a pulse is applied to B IC106 (3). While 2 msec. pulses are successively input to B, Q continuously outputs high. If IC107 runs away, the 2 msec. pulse disappears so that Q becomes low 1 sec. later and IC107 is restarted from start address.

3. THEORY OF OPERATION

Real-time Clock



IC151 is a real-time clock with calendar function operated on either the instrument's power supply or the lithium battery BAT151.

When the power of +5V is turned off, IC151 is powered by BAT151 of +3V (standby condition) in a state of lower power consumption. In this condition, clock function is internally available but interface with other devices is not guaranteed.

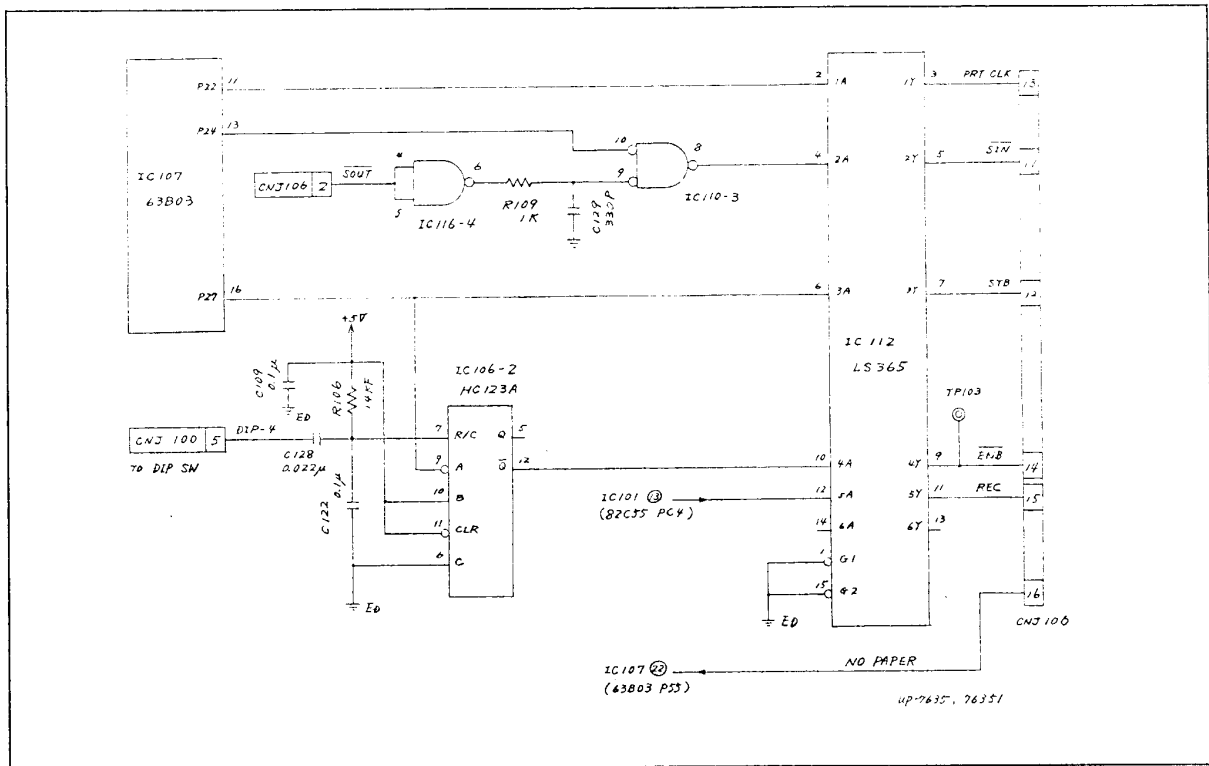
When the power is turned on, D151 turns on, D152 turns off and +5V power source is selected. In transit state to/from standby condition, CS1 (chip select) of IC151 (15) is kept low to disable to break the clock data. CS1 is controlled by the voltage monitor IC105 (See the power on reset). When VDD of IC151 becomes 4.0V and IC151 is released from standby condition as the threshold level of power supply voltage for the standby is 4.0V, CS1 becomes high and the interface becomes available 100 msec. after the power supply voltage reaches 4.7V.

The external crystal oscillator X151 provides 32.768kHz. This oscillation pulse divided into 64.000Hz at STD.P is adjusted with C152.

Low level of CS0 allows IC151 to access to external devices.

Data Transfer to Recorder

Recording Data Transfer

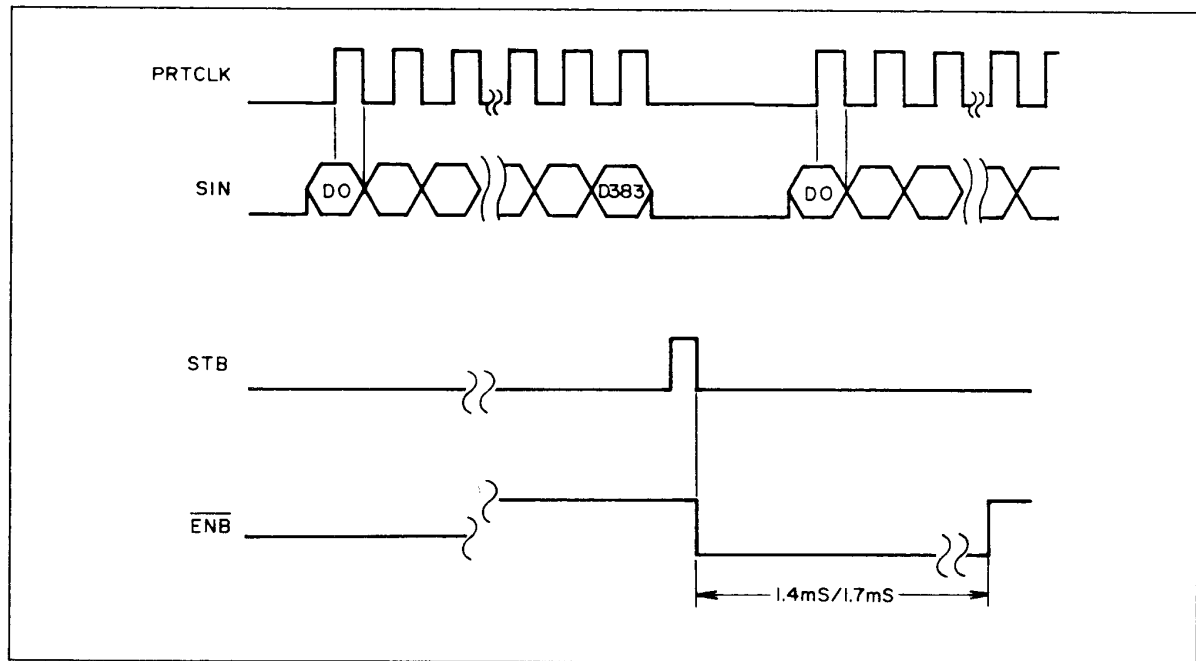


Recording data is transferred from the serial communication interface (SCI) of the host CPU IC107 to the thermal head in the recorder.

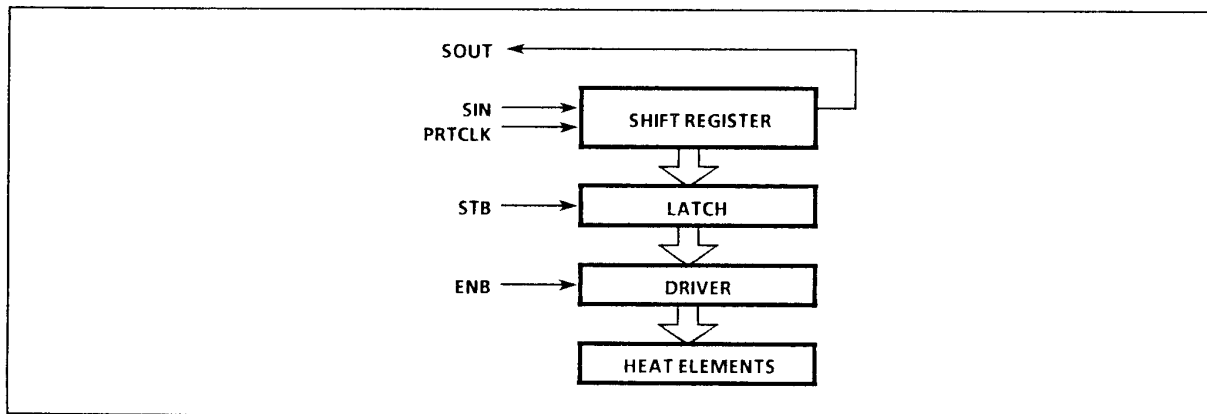
The serial data SIN is output from the SCI P24 of IC107 (13) in synchronization with the PRTCLK (printer clock). When one row line data of 384 points — 8 dots /mm $\times$ 48mm (recording width) — is output to the shift register in the thermal head for serial-to-parallel conversion, a STB (strobe) pulse appears at P27 of IC107 (16) to latch the data. Negative going edge of STB allows the monostable multivibrator IC106-2 to generate a low pulse ENB (enable) to drive heat elements. The pulse width of ENB determined by R106, C122 and C128 controls the darkness (temperature) of the recording trace. When No. 4 of the DIP switch on the side panel is set to "HIGH" (using Nihon Kohden specified paper), CNJ100 (5) is opened, C122 and R106 generates ENB of 1.4ms. When set to "PPR SENS" (using medium sensitivity paper), CNJ100 (5) is grounded, C122, C128 and R106 generates ENB of 1.7ms.

3. THEORY OF OPERATION

Recording Data Transfer Timing



Thermal Head Block Diagram



When the same heat element is continuously heated, excessive heating resulting in the shortening of the life of the thermal head occurs. To avoid two heatings successively, carry SOUT from the shift register controls the SIN. When a certain element has been heated in the previous cycle, SOUT becomes low to block the SIN.

3-3-4 CRT CPU

Outline

The CRT CPU section controls :

Display data transfer from the host CPU through the CRT CPU RAM

Peak-bottom processing of ECG waveform

D/A conversion of the waveform

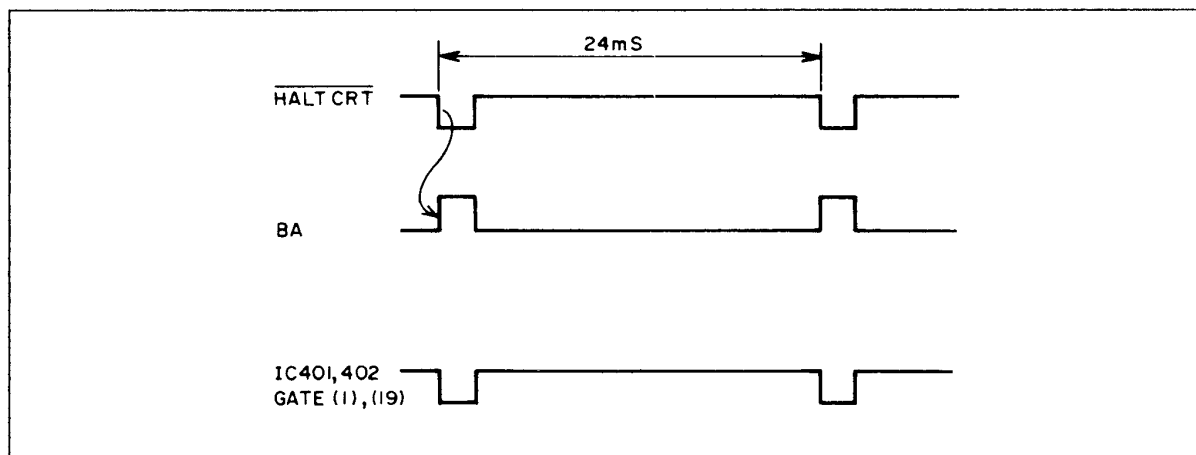
Timing control signal generation for the CRT driver

The CRT CPU operates on 2MHz system clock according to the program in the internal ROM (TEC-7100/7200) or ROM IC413 (TEC-7300). The host CPU halts the CRT CPU every 24 msec. to transfer the data. After the data is transferred, the CRT CPU sends one frame data, the D/A converted ECG waveform of two channels for XY display mode and the serial character data for raster scan display mode, with timing control signals to the CRT driver.

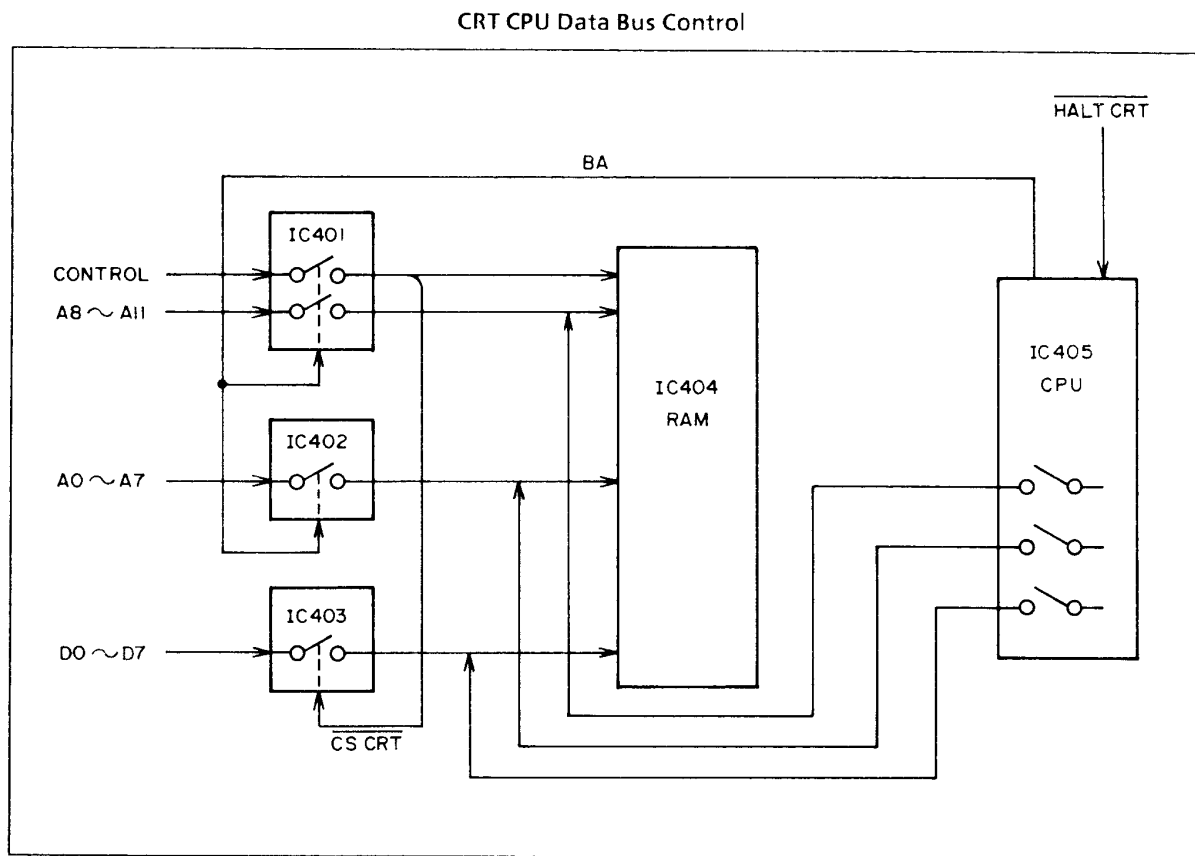
Communication with the Host CPU

Every 24 msec. the host CPU halts the CRT CPU IC405 and transfers the data to the CRT CPU RAM IC404. When HALTCRT becomes low, the CRT CPU disconnects the bus line from itself and BA (bus available) becomes high to turn on the three-state buffer IC401~402 for the control and address bus. When the host CPU writes the data to IC404, CSCRT becomes low to turn on the bi-directional three-state buffer IC403 for the data bus and to enable IC404 to access data. RD controls the transfer direction of the buffer.

CRT ECG Data Bus Control Cycle



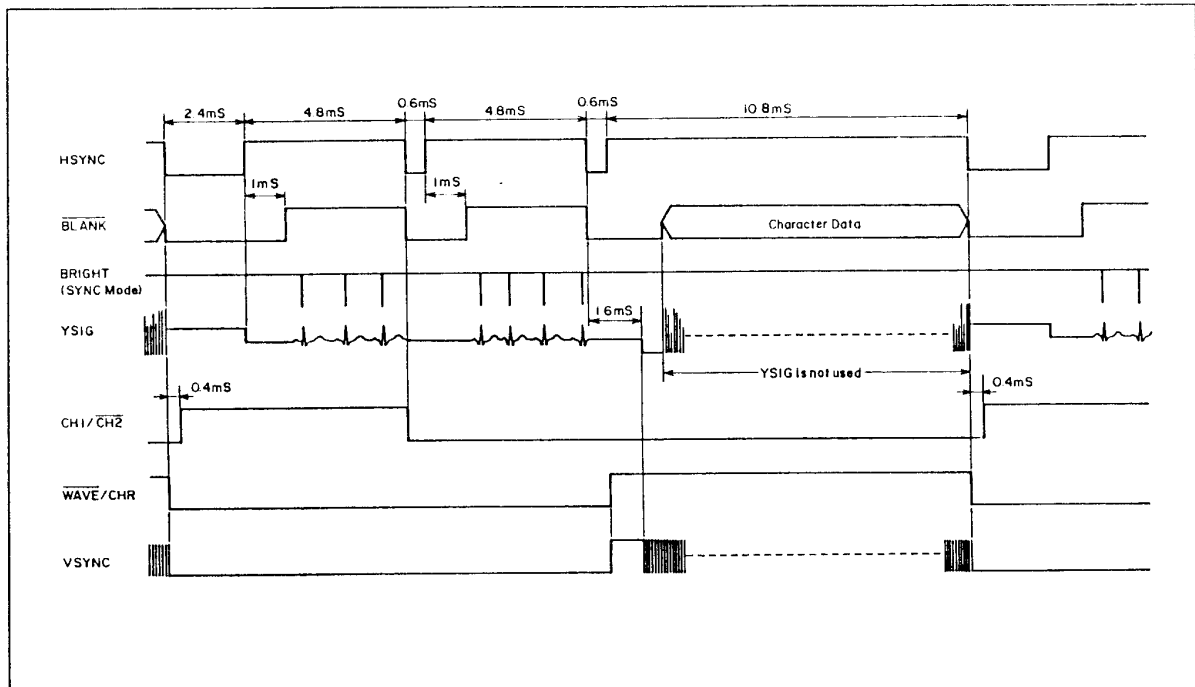
3. THEORY OF OPERATION



One-frame Display Cycle

Horizontal sweeps are made while the HSYNC is high. Two sweeps for ECG waveforms and one sweep for characters are made in one cycle. The WAVE/CHR selects the display mode, the XY mode for the ECG waveforms and the raster scan mode for the characters. D/A converted waveform signal YSIG is displayed while BLANK is high. The BRIGHT pulse intensifies the brightness of the ECG waveform to display the QRS synchronized spot in SYNC mode. The vertical position of the ECG is controlled by the CH1/CH2. Raster timing for characters is controlled by the HSYNC and VSYNC. Character data modulates the BLANK.

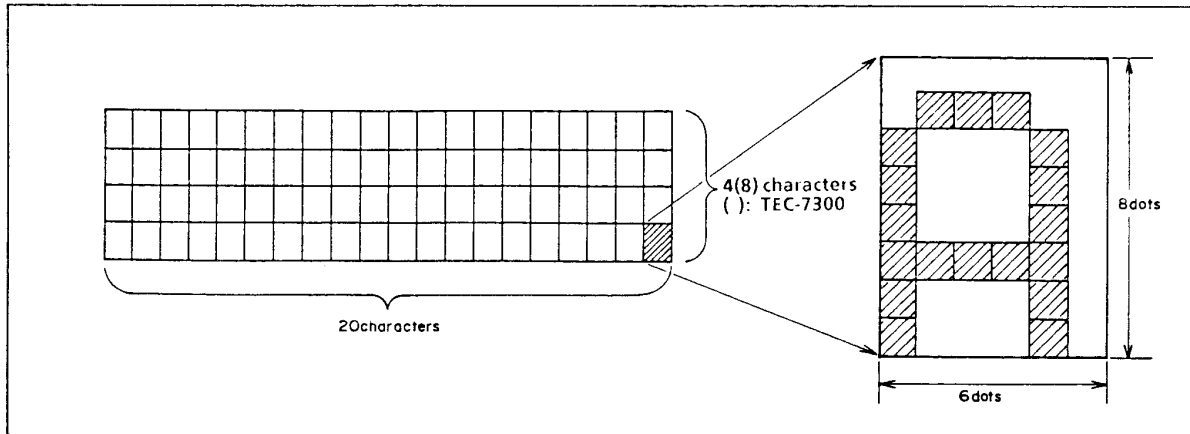
Waveform and Character Data Transfer Timing



3. THEORY OF OPERATION

Character Data Transfer to CRT Driver

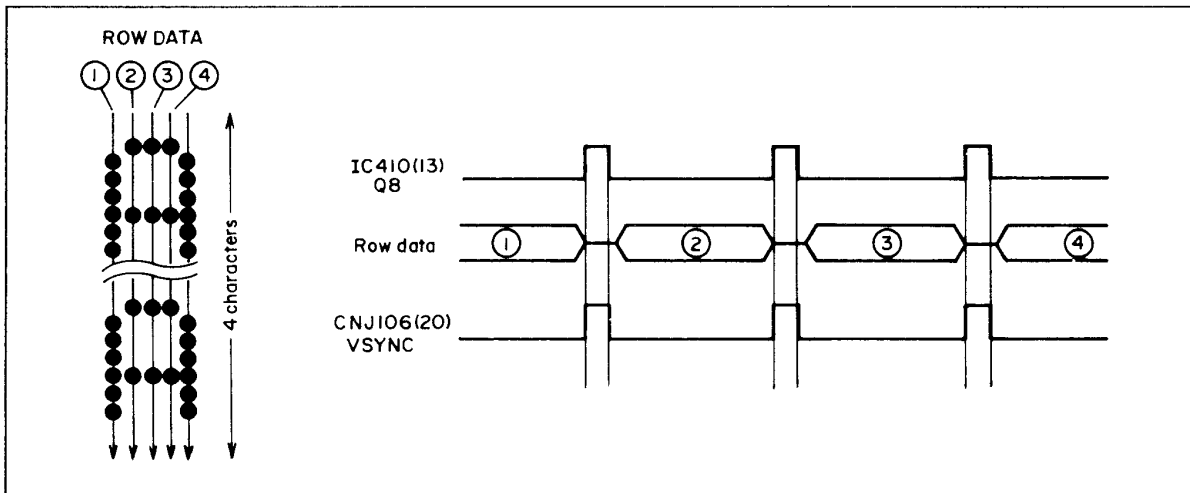
Character Display Area



Vertical Sync VSYNC

VSYNC at CNJ106 (20) triggers a vertical scan. VSYNC is controlled by Q8 of the frequency divider IC410 (13) and P25 of the CRT CPU IC405 (14). Q8 becomes low by P23 output to reset IC410. P25 is low in character display mode. When VSYNC becomes low, the scan starts. While VSYNC is low, one vertical line data of four characters ($8 \text{ dots} \times 4(8) \text{ characters} = 32(64) \text{ dots}$, () : TEC-7300) is transferred to the CRT driver.

Character Data Transfer Timing (4 vertical scans)

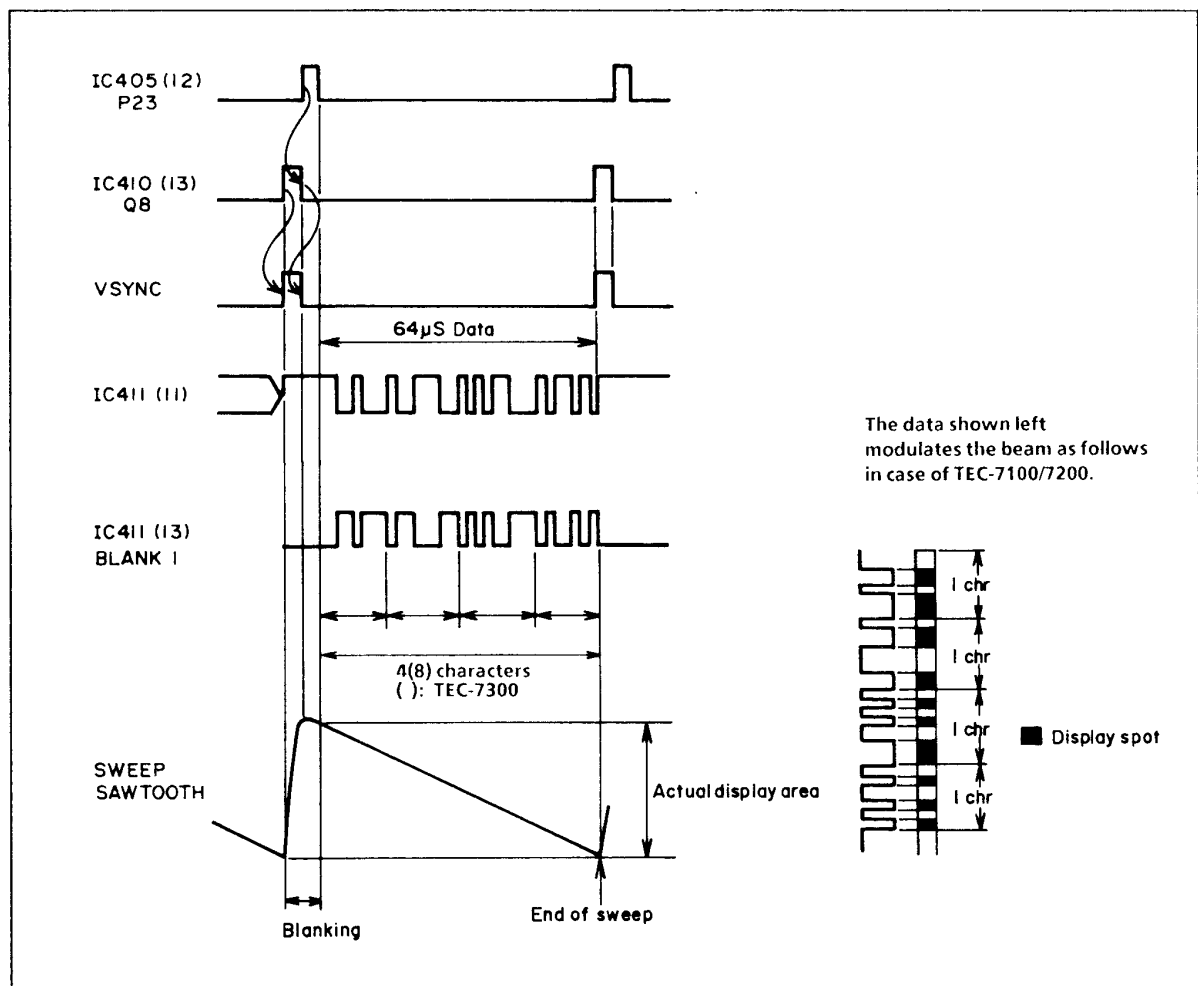


Blanking BLANK1

BLANK1 has two functions : blanking the beam between the end of one sweep and the beginning of the next sweep and modulating the beam to display characters according to the character data.

After 32 dots (64 dots in TEC-7300) data are transferred, the beam is blanked according to the following logic. Q8 becomes high, VSYNC becomes high, STRB (strobe) of multiplexer IC409 (7) becomes high, Y out becomes low, IC411 (11) becomes high and BLANK1 of IC411 (13) becomes low. Then P23 of IC405 (12) becomes high, IC410 is reset, Q8 becomes low, VSYNC becomes low and the next scan starts. BLANK1 is still low because P23 is kept high. As the beginning area of the scan is not exactly linear, characters are not displayed in this area. When the scan reaches the display area, P23 becomes low, IC410 starts counting and the data is transferred. According to the data, Y of multiplexer IC409 modulates BLANK1.

Character Data Transfer Timing (One vertical scan for 4 characters)

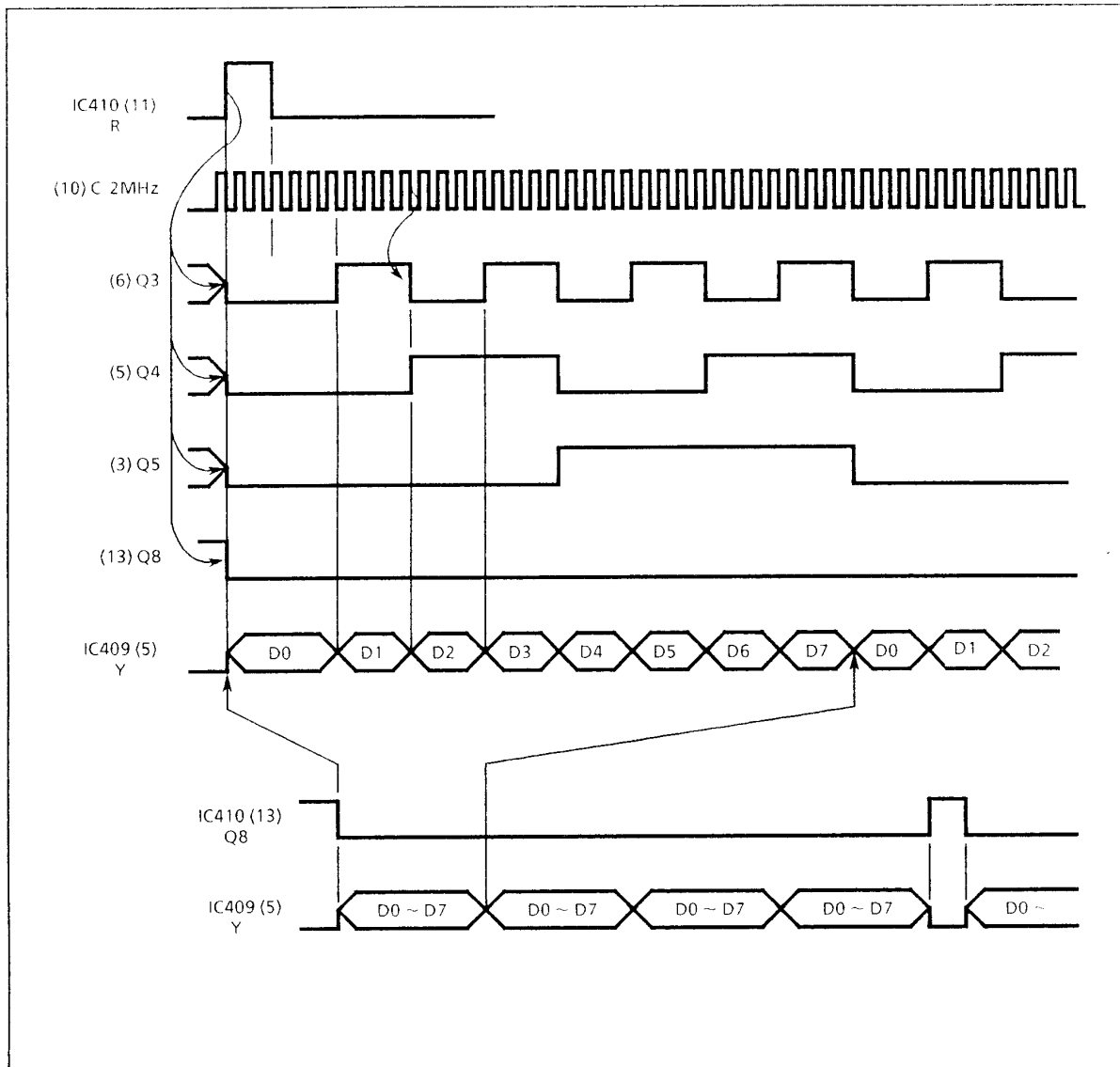


3. THEORY OF OPERATION

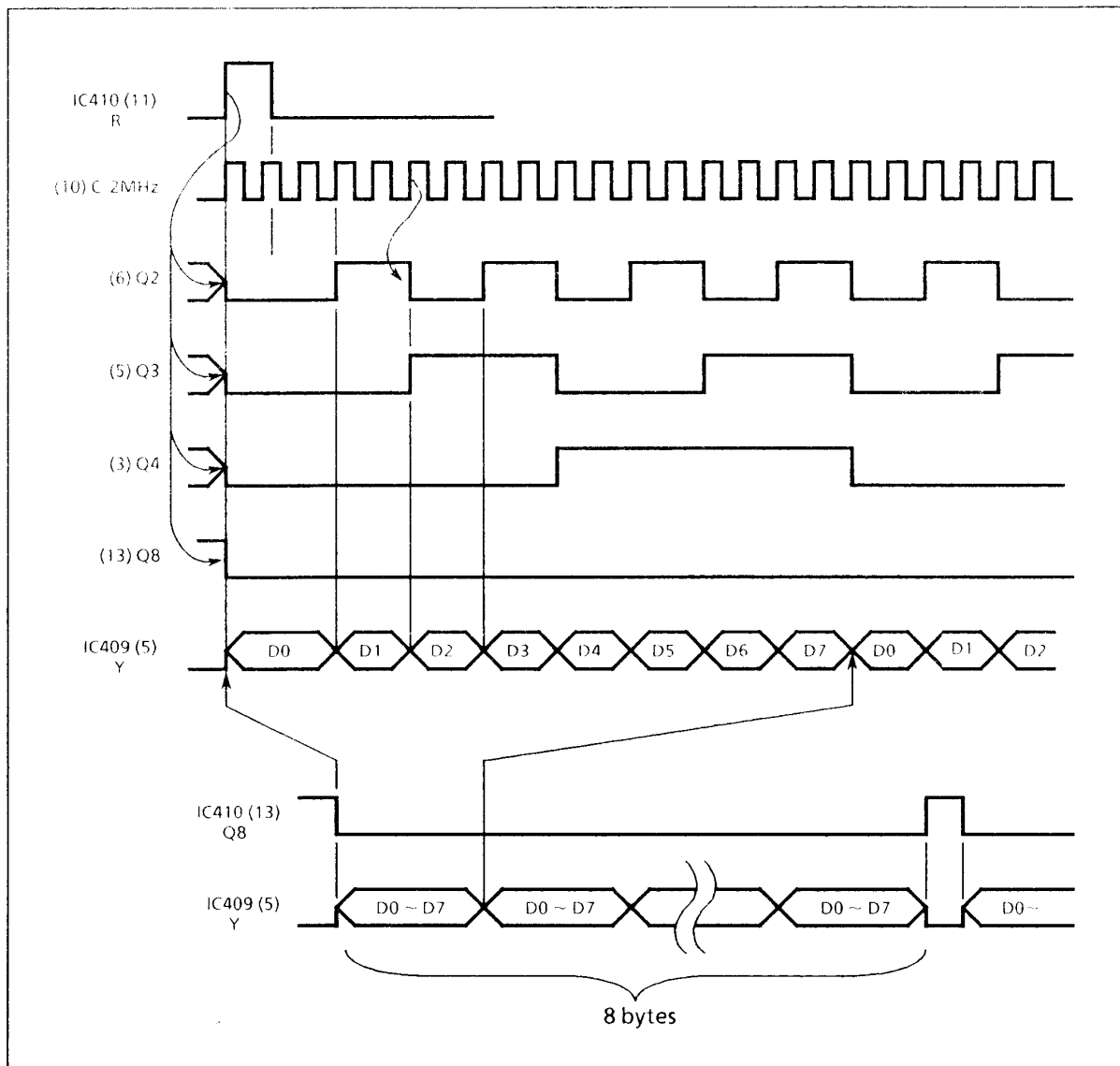
Character Data Decoding

Character data from the CRT CPU IC405 is converted from parallel data to serial data by the multiplexer IC409. Input selection of IC409 is controlled by Q3~Q5 (Q2~Q4: TEC-7300) of frequency divider IC410. The CPU supplies a clock pulse of 2MHz to IC410. When P23 IC405 becomes high, reset of IC410 is released. IC410 starts counting and IC409 outputs D0~D7. Although D0~D3 are directly sent to IC409, D4~D7 are latched by IC408. After IC409 outputs D0~D3 at Y, Q5 becomes high to latch D4~D7 in IC408. While IC410 outputs D4~D7, the next D0~D7 appears on the bus line.

Character Data Transfer Timing (One vertical scan for one character (TEC-7100/7200))



Character Data Transfer Timing (One vertical scan for one character (TEC-7300))



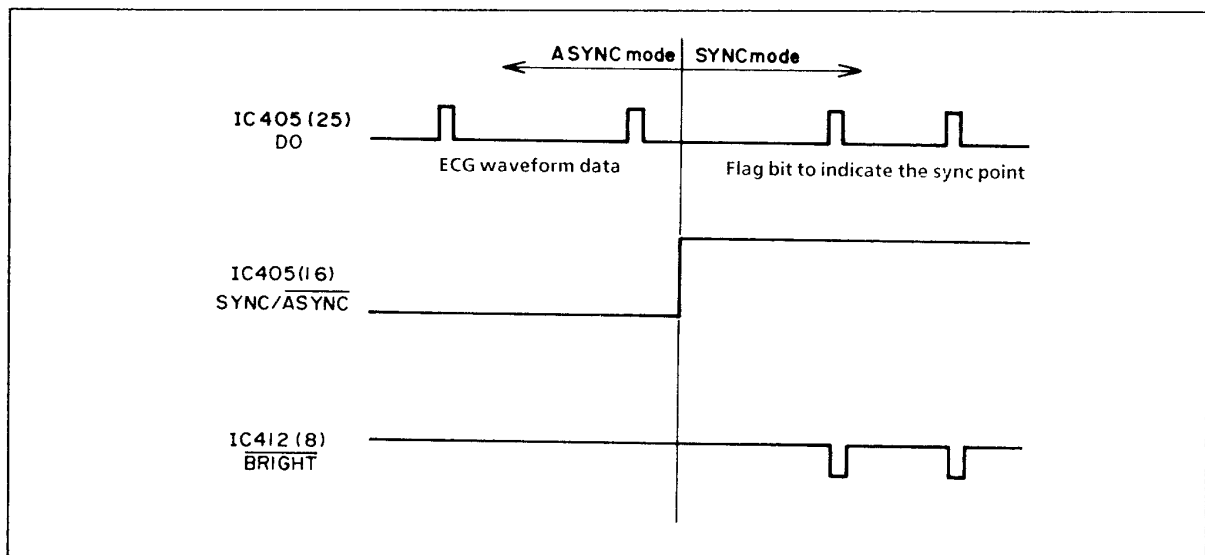
Waveform Data Transfer to CRT Driver

Digital ECG waveform data is transferred from the host CPU through RAM IC404. The data is D/A converted by IC406 and IC114-2 and sent to the CRT driver Y deflection amplifier as YSIG. In the waveform display mode, P25 of CRT CPU IC405 (14) is high so that VSYNC is blocked and BLANK1 is controlled by only P23. P23 is high between the end of one sweep and the beginning of the next one to blank the beam. CH1/CH2 at P24 of IC405(13) selects the display of waveforms. When CH1/CH2 is high, the waveform is displayed in the upper area.

QRS Sync Spot BRIGHT

In SYNC mode, the synchronized point is indicated as a spot on the QRS waveform. This spot is created by intensifying the brightness of the beam when BRIGHT is low. In SYNC mode, D1~D7 sent to IC406 are the ECG waveform data and D0 is flag bit to indicate the sync point. As D0 is also ECG waveform data in ASYNC mode, P27 of IC405 becomes low to block D0 appearing at BRIGHT.

Sync Spot Display Timing



Peak-bottom Processing

As 1/3 of the ECG data transferred from the host CPU is used for display, peak-bottom processing is performed in software to display the peak of the steep QRS waveform accurately. The ECG waveform is A/D converted every 2 msec. In peak-bottom processing, one of the three points is selected every 6 msec. One block is comprised of three individual data. The individual data of two time-sequential blocks is compared. From each block the data with the greatest difference in amplitude from that of the data selected in the immediately preceding block is then selected.

CRT CPU Pin Description

Pin No.	Symbol	I/O	Function
1	Vss	---	Ground
2	XTAL	---	Not used
3	EXTAL	I	Clock 8 MHz
4~5	MP0~MP1	I	Operation mode selection
6	RES	I	Reset — 0 : Resets the CPU when the power is turned on
7	STBY	I	Not used
8	NMI	I	Non-maskable interrupt — Negative edge causes restart from start address. HALTCRT is sent to this input from the host CPU.
9	P20	O	VSSET (Vertical scan set) — 0 : Until vertical scan reaches to character display area starting from the left end.
10	P21	O	HSYNC (Horizontal synchronization)
11	P22	O	WAVE / CHR — 0 : Waveform display, 1 : Character display
12	P23	O	Blanking — 1 : While blanking beam between the end and the start of sweep.
13	P24	O	CH1 / CH2 — 1 : Waveform is displayed on channel 1. 0 : Waveform is displayed on channel 2.
14	P25	O	WAVE / CHR — 0 : Character display, 1 : Waveform display
15	P26	O	LEADS OFF : Square waveform of 300 Hz is sent to the transmitter when the transmitter receives the signal from the main unit and an electrode connected to the main unit is detected.
16	P27	O	Sync mode — 1 : Sync mode
17~19	P50~P52	---	Not used
20	P53	I	HALTCRT — 0 : The CRT CPU is halted by the host CPU.
21~22	P54~P55	---	Not used
23	P56	I	CALDISP (Internal DIP SW setting) — 0 : A calibration waveform appears at the left end of the 2nd trace.
24	P57	---	Not used
25~32	P60~P67	I/O	D0~D7 — Data bus for the D / A converter
33	Vcc	I	Power — + 5 V
34~41	P47~P40	O	A15~A8 — Address bus

Pin No.	Symbol	I / O	Function
42	Vpp / OE	---	Not used
43~50	P17~P10	O	A7~A0 — Address bus
51~58	P37~P30	I / O	Data bus
59	P74	O	Bus available — 1 : The CRT CPU disconnects the bus when the CRT CPU halts.
60~61	P73~P72	---	Not used
62	P71	O	WR (Write) — 0 : Writes the data into the RAM.
63	P70	O	RD (Read) — 0 : Reads the data from the RAM.
64	E	O	Clock pulse of 2 MHz for character data decoder.

3-4 CRT Driver UP-7740

Outline

The CRT driver drives the horizontal, vertical and position yoke controlled by the signal sent from the CRT CPU to display the waveforms and characters.

The HSYNC controls a sawtooth waveform to drive a horizontal yoke for the horizontal sweep. The sweep speed, width and vertical position change according to the display mode of waveforms and characters. The display mode is controlled by the WAVE/CHR. The vertical deflection waveform also changes according to the display mode. In the waveform display mode, the YSIG is used as a vertical deflection signal. In the character display mode, the VSYNC controls a sawtooth waveform for the vertical scan and the BLANK controls beam on/off for modulation. The BLANK also blanks the beam between the end and start of both the horizontal and vertical sweep.

3. THEORY OF OPERATION

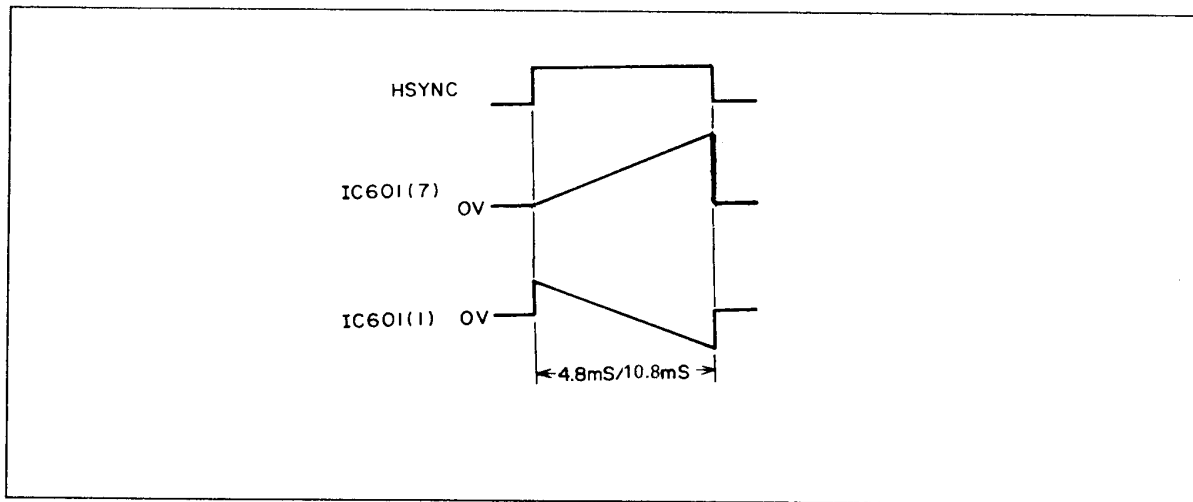
Sweep Speed Control

The sweep speed is controlled by the charging speed of the integrator IC601-2. In the character display mode, the WAVE/CHR is high. When the HSYNC becomes high, $-3V$ is connected to C601 through R653 and integration starts. The charging speed is determined by R653 and C601. When the HSYNC becomes low, C601 is discharged through R603. In the waveform display mode, the WAVE/CHR is low. Therefore the charging speed is determined by R652 and C601.

Horizontal Position Control

The offset voltage controlled by IC602-1 is added to the sawtooth to shift the level so that the center of the sawtooth and the level of blanking period become $0V$. This offset voltage addition is controlled by the HSYNC and WAVE/CHR. In the character display mode, when the HSYNC is low, $-3V$ is connected to IC601-1 through R651. The offset of $-3V \times (R607/R651)$ is added to IC601-1. In the waveform display mode, the offset of $-3V \times (R607/R650)$ is added. These offset voltages are added only when HSYNC is high. The horizontal position for both the waveforms and characters is adjusted by VR602.

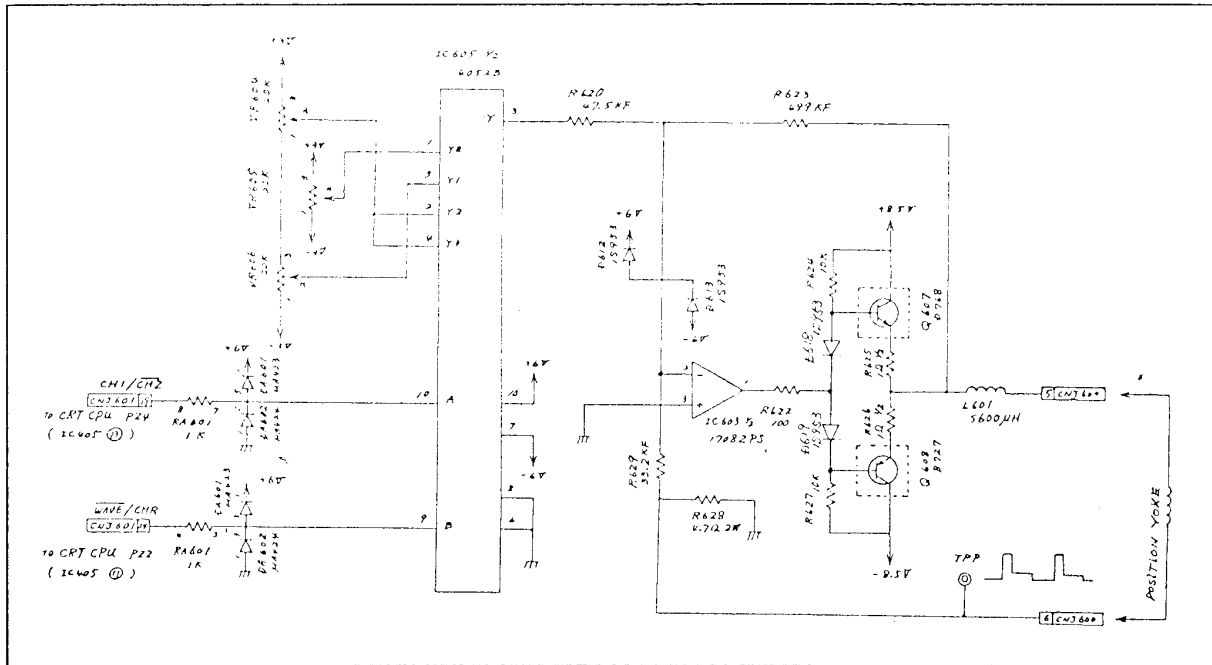
Horizontal Sweep Sawtooth



Driver

When the input voltage of IC603-2 becomes a positive maximum, the output becomes negative, the base voltage of Q603~604 decreases, the emitter voltage decreases and becomes negative, current flows from CNJ600-2 to CNJ600-1 through the yoke, and the sweep is initiated at the left end of the screen. IC603-2 has two feedback loops. The main feedback is through R610, and the yoke is delayed due to the inductance of the yoke. The feedback through R608 compensates this delay to return the beam quickly. Then the horizontal deflection width is adjusted by VR601.

Vertical Position Control



This circuit controls vertical positions for characters and ECG of channel-1 and -2. Current for the position yoke is controlled by CH1/CH2 and WAVE/CHR sent from the CRT CPU. The relationship between control signals and outputs is shown below.

Position Control IC605

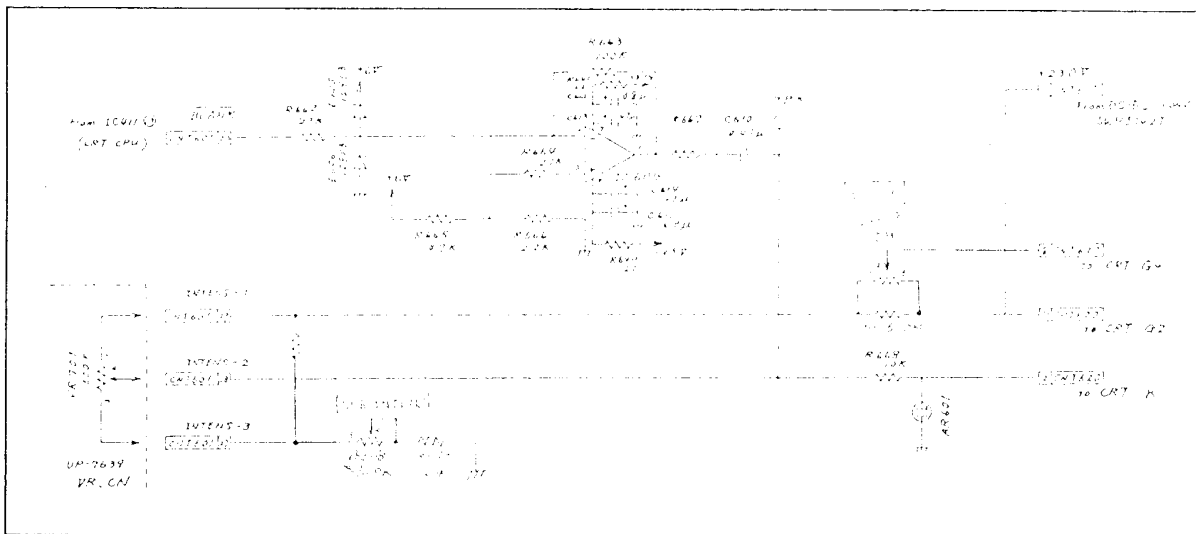
Control		Output	Display mode
A (CH1/CH2)	B (WAVE/CHR)		
X	1	Y2/Y3	Character
1	0	Y1	Waveform CH-1
0	0	Y0	Waveform CH-2

x : Irrelevant

For example, when channel-1 is selected, negative voltage is applied to IC603-1 (2), the output increases, the base voltage of Q607~608 increases, the emitter voltage increases, the yoke current increases and the baseline position goes up. Feedback through R629 is delayed by the inductance of L601 and the yoke. Feedback through R623 compensates for this delay.

3. THEORY OF OPERATION

Blanking

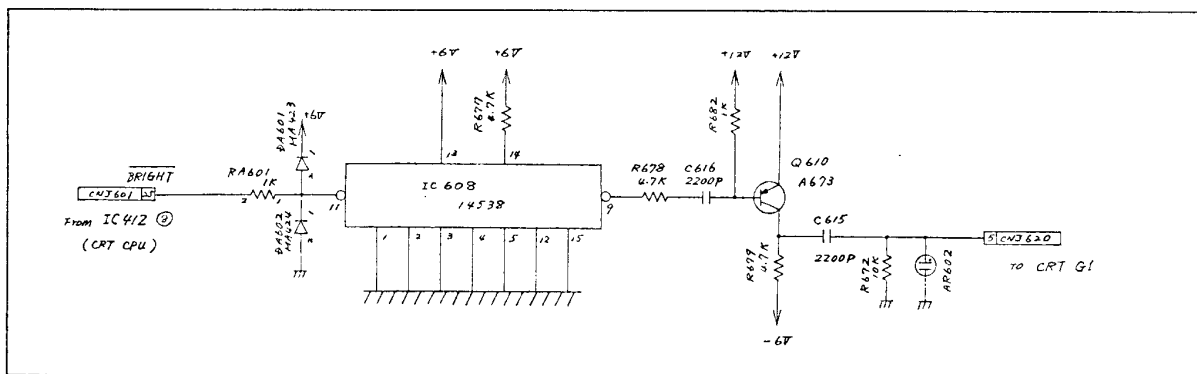


The BLANK controls the cathode voltage to turn on/off the beam. IC604 amplifies the BLANK (0 or +5V) to provide a saturated output with an offset of +1.9V. The cathode voltage of +230V divided by R674~676, R671, R673 and VR701. When the BLANK is low, the cathode voltage increases to turn off the beam.

VR608 adjusts the adjusting range of VR701 for intensity control.

VR609 adjusts the voltage of G4 for focus control.

QRS Sync Spot



The QRS synchronized point is displayed as a spot on the QRS waveform. When the BRIGHT becomes low, the monostable multivibrator IC608 generates a low pulse and the grid voltage increases to intensify the beam brightness. Stray capacity narrows the pulse width of IC608.

3. THEORY OF OPERATION

The switching regulator controller IC501 controls the switching of the transistor Q500~Q502. IC501 comprises the oscillator, dead time comparator, PWM comparator, two error amplifiers, flip-flop, output control and reference voltage generator. Energy charging start/stop is controlled by the dead time comparator and the error amplifier-2. The error amplifier-2 protects the circuit from overcharging. The error amplifier-1 controls the output pulse width to regulate the output current. The dead time and PWM comparators compare the level of the sawtooth waveform generated by the built-in oscillator with the level of the control signal.

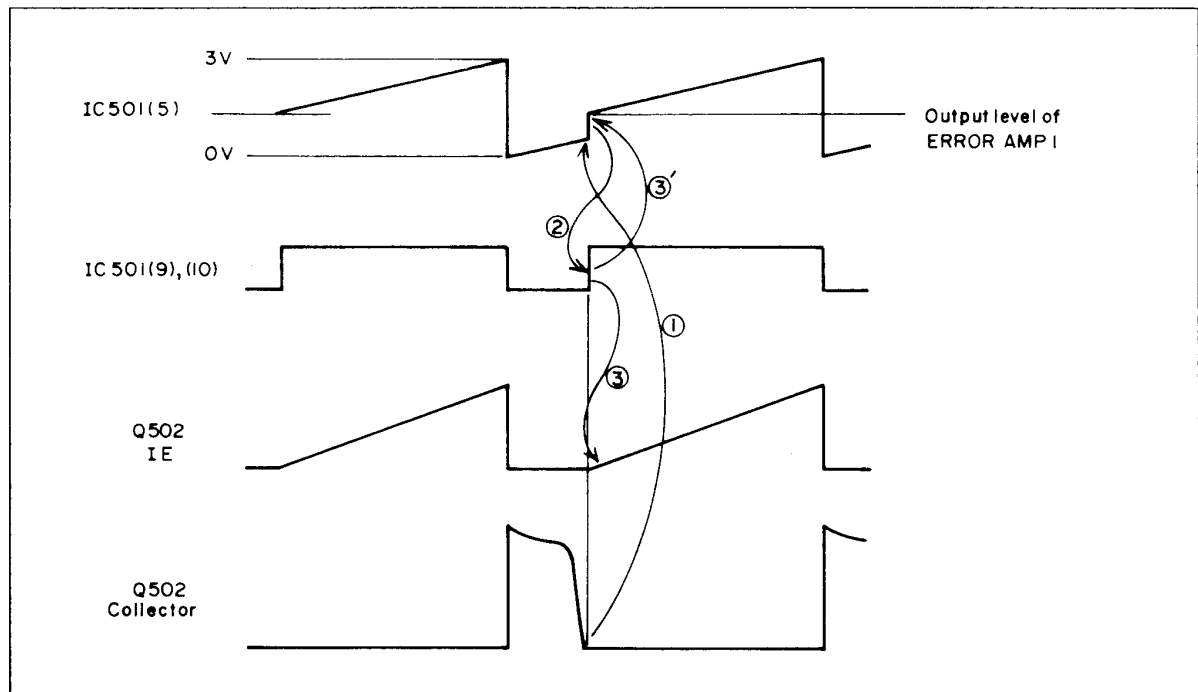
When not charging, the CHGON is low, IC501 (4) is high, the dead time comparator has a constantly high output as the control input level is higher than the sawtooth input level, and the output transistors are turned off. When the charge button is pressed, the CHGON becomes high, (4) becomes low gradually due to C501. When the control input level becomes lower than the peak level of the sawtooth, the dead time comparator outputs pulses to turn on/off the output transistors for charging. Then (4) continues to become lower, when the control input level becomes lower than the bottom level of the sawtooth, the dead time comparator constantly outputs low. At this time switching is controlled by the PWM comparator.

The PWM comparator compares the sawtooth with the output of the error amplifiers. The pulse width of the PWM comparator is controlled by the output level of the error amplifier-1. The output current through R509 is converted into the voltage. The error amplifier-1 provides the mean voltage to the PWM comparator. When the current increases, the turn-on time of the output transistors is shortened and the current is regulated.

When the output of IC501 (9)/(10) is high, Q500 and Q502 turn on and the current flows through T500. The current is a sawtooth waveform due to the inductance of T500. The sawtooth at IC501 (5) becomes 0V when it reaches +3V, Q502 turns off, the collector potential of Q502 becomes high and the energy stored in the primary winding is transferred to the secondary winding. After one pulse charging, the collector potential of Q502 becomes 0V.

- ① The collector of Q502 is 0V. As Q502 is turned off, IC502 (10) is low. IC502 (3) outputs high, C502 is charged and the level of IC501 (5) goes up.
- ② The level of IC501 (5) exceeds the output level of the error amplifier-1 and IC501 (9)/(10) becomes high.
- ③ The current of Q502 increases.
- ③' The output of IC501 (9)/(10) becomes high, IC502 (3) becomes low, D501 turns off and the sawtooth slope is controlled by the internal oscillator.

High Voltage Switching Timing



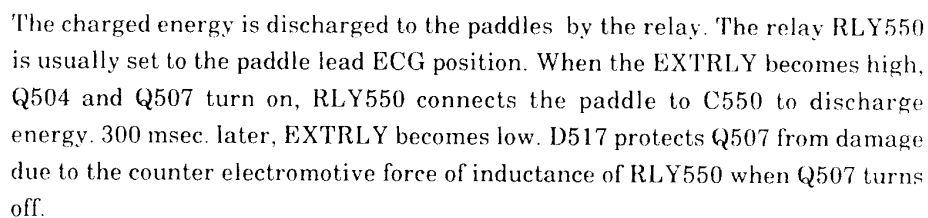
Charge Energy Monitor

IC504-1 divides the charged voltage in C550 by 1/1250 and the resulting voltage is sent to the A/D converter of the ECG/CPU as the CHGAD. IC504-2 also monitors the charged voltage for safety. If the circuit is faulty and the voltage of C550 exceeds 5 kV, the CHGAD at TP506 becomes +4V, IC504-2 saturates to negative, D522 turns off, the control input of the error amplifier becomes 0V, the error amplifier's output is high, the PWM comparator's output is constantly high and charging stops. At the same time, Q506 turns off, the OVERCHG becomes high (pulled up in the ECG/CPU), the host CPU makes the CHGON low, discharges the energy internally and displays "ERROR4" on the CRT.

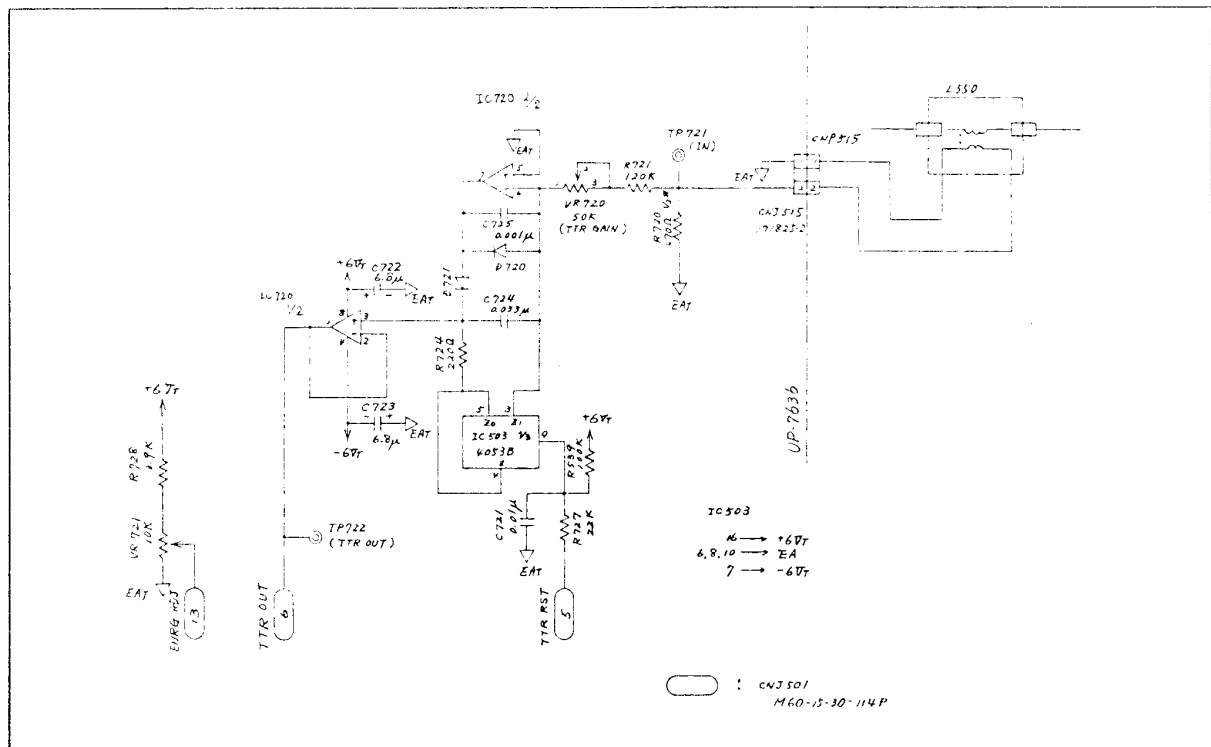
Internal Discharge

When the energy is not charged, the INTRLY is low, Q503 turns off and the internal discharge relay RLY501 is closed and C550 is not charged. When the energy is charged, RLY501 opens. When discharging the energy, internally in the same manner as above, RLY501 is closed and the charged energy is consumed through R529~534. D515 protects Q503 from damage due to the counter-electromotive force of the inductance of RLY501 when Q503 turns off.

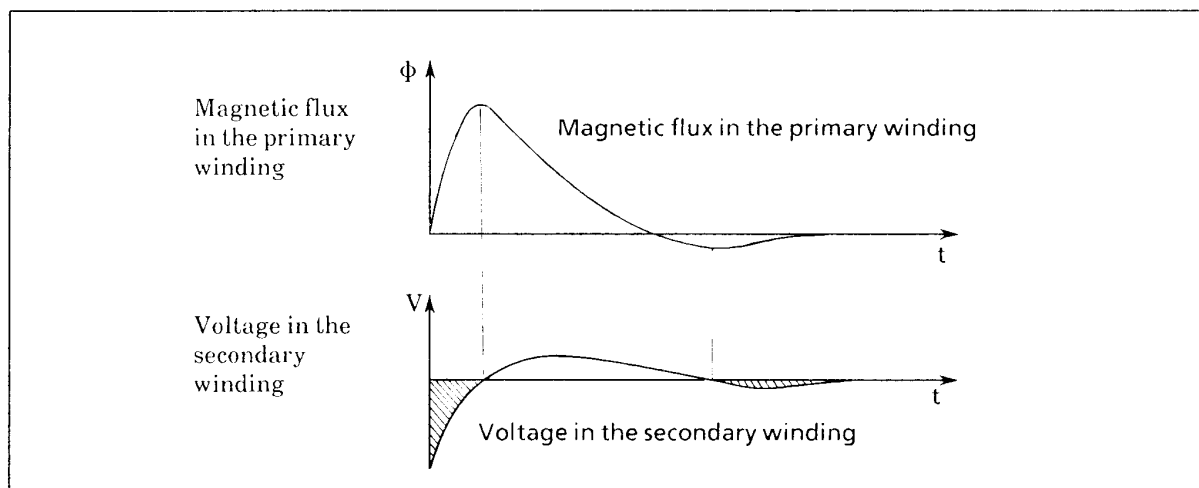
External Discharge


$$(\text{Indicated energy}) = (\text{Stored energy}) \times 50 / (50 + 9)$$
$$(\text{Delivered energy}) = (\text{Stored energy}) \times R/(R + 9)$$

TTR Detection (Not used in TEC-7100)



When the energy is discharged externally, the change of magnetic flux in the primary winding of L550 induces the voltage in the secondary winding, the negative voltage at the secondary winding is integrated, and the host CPU calculates the TTR and delivered energy according to the integrated value.

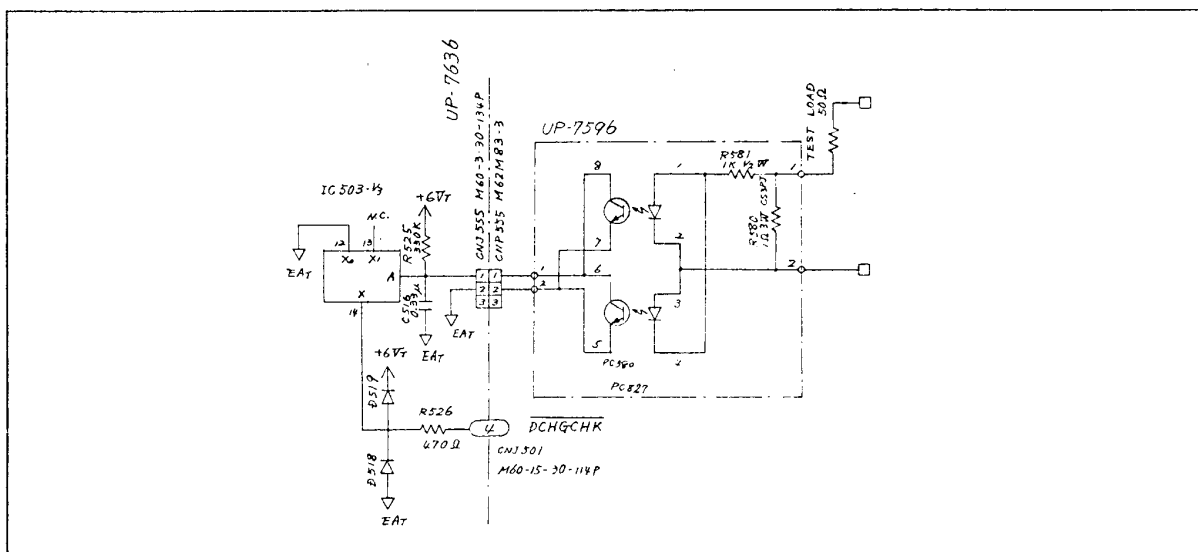


An integrator with a rectifier IC720-2 integrates this change of the negative area. When the input of IC720-2 is negative, D721 turns on and C724 is charged

3. THEORY OF OPERATION

for integration. When positive, D720 turns on and C724 is not charged. The integrated value TTROUT is sent to the A/D converter of the ECG/CPU through the buffer amplifier IC720-1. The host CPU calculates the TTR and delivered energy. The TTRGAIN VR720 adjusts the integration value. The ENRGADJ at CNJ501 (13) is the reference for calculation. After discharge, the TTRRST becomes high to reset the integrator.

Discharge Test Detection



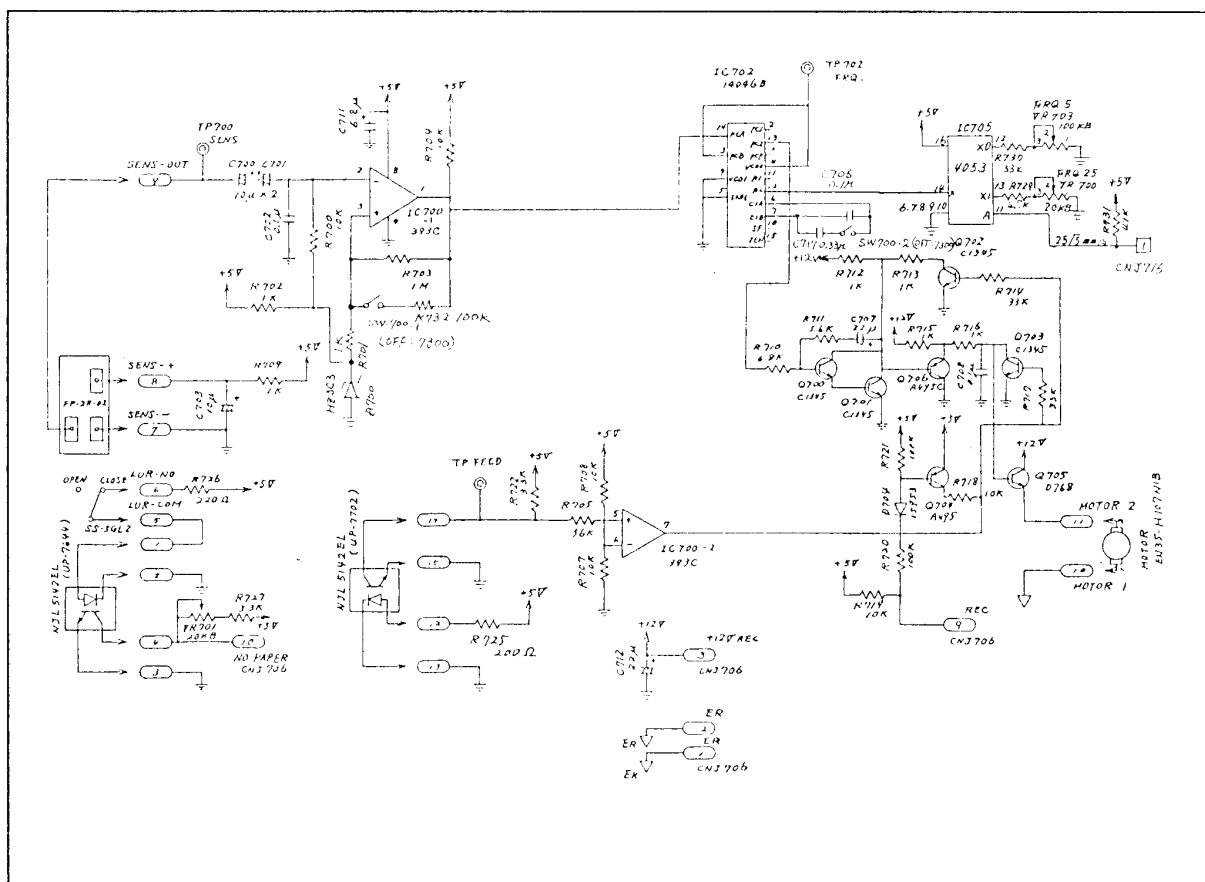
The host CPU recognizes that the energy is discharged to the test load by the DCHGCHK. When the energy is discharged to the test load, the photocoupler PC580 turns on and a low pulse is applied to the multiplexer IC503-1 to generate the low pulse DCHGCHK. C516 and R325 widens the pulse width.

This circuit of TEC-7100 checks whether the energy is discharged to the test load. This circuit and TTR detector of TEC-7200 check whether the proper amount of energy is discharged to the test load.

3-6 Motor Drive Control UP-7738

Outline

The paper feeding motor is controlled by the control signal from the host CPU. The rotation of the motor is regulated by the feedback from the rotation sensor. The opening of the head and the running out of paper are sensed and the signals are sent to the host CPU. For the thermal head operation, see the Data Transfer to Recorder section of 3-3-1 Host CPU.



3. THEORY OF OPERATION

Rotation Sensor

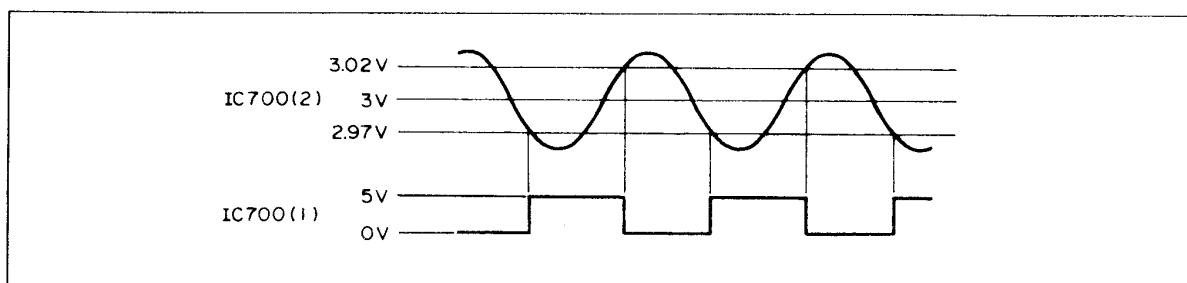
A power of +5V is supplied to the magnetic rotation sensor. R709 and C703 cut a high frequency noise. The sensor outputs a sine waveform of several hundreds mV. The frequency of the waveform corresponds to the rotation of the motor. IC700-1 is a hysteresis comparator with an offset of +3V by D700. R701 and R703 determine the hysteresis characteristic. When the potential of IC700-1 (2) is higher than (3), the output becomes 0V and the potential of (3) V(3) is;

$$V(3) = 3 - 3 \times R701 / (R701 + R703) \\ \approx 2.97V$$

When the potential of (2) decreases less than V(3), the output becomes +5V and the potential of (3) V(3) is;

$$V(3) = (5 - 3) \times R701 / (R701 + R703) + 3 \\ \approx 3.02V$$

Waveform Shaping of Rotation Sensor



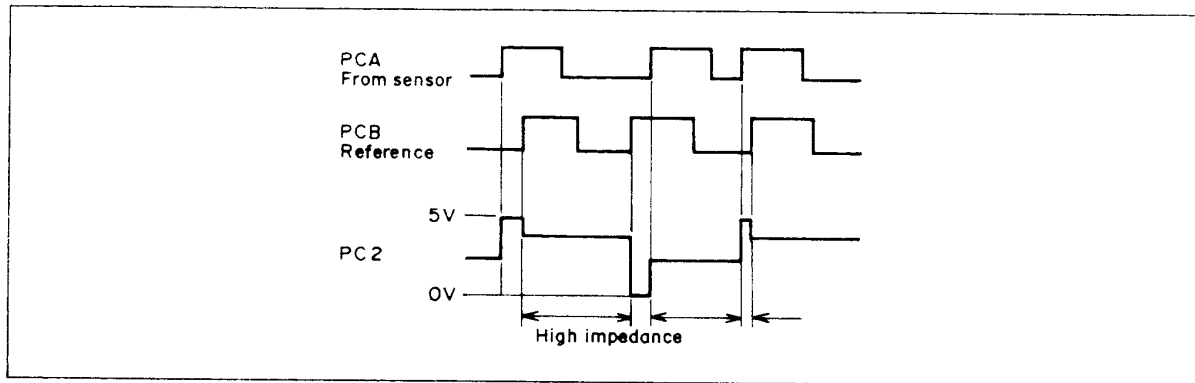
SW700-1 changes the gain of the amplifier. This switch is set to on for the TEC-7300 to increase the gain, as the output level of the sensor of the TEC-7300 is smaller than that of the TEC-7100/7200.

Phase Locked Loop

PLL IC702 compares the phase of the sensor signal PCA and the reference signal to regulate the rotation of the motor. When the motor rotates faster than specified, the advanced phase generates the positive level as shown below.

The frequency of the reference signal PCB is determined by the resistors connected to IC702 (12) and the capacitors connected to IC702 (6) and (7). The frequency is 294.8Hz in the TEC-7100/7200, and 1178.9Hz (25mm/s) or 235.8Hz (5mm/s) in the TEC-7300. Analog switch IC705 selects the frequency of the reference signal with the paper speed select signal 25/5mm/s. In the TEC-7100/7200, this select signal is fixed too high.

PLL Phase Comparison Timing



Integrator

R710~712 and C707 smoothen the output of IC702. When the motor rotates faster than specified, IC702's output is high, the base potential of TR700 increases, the potential of the collector of TR701 decreases, the potential of the emitter of TR706 and 705 decreases and the motor rotation is slowed. In contrast, when the motor rotates more slowly, the rotation is accelerated in the opposite manner.

Start / Stop Control

The REC from the host CPU controls the start/stop of the motor. When the REC is low, TR704 turns on, TR702~703 turn on, and TR705 turns off to stop the motor. When the REC is high, the motor runs.

Paper Feed Control

Paper feed lever action is sensed by the photo-reflector comprised of an LED and a sensor. The paper feed lever is linked to the reflector which moves together with the lever position. The reflector is usually positioned so that the light emitted from the LED does not reach the sensor. When the sensor does not receive the light, (14) and (15) of CNJ700 are open, the open collector comparator IC700-2 turns off and the start/stop is controlled by the REC. When the paper feed lever is pressed down, (14) and (15) are on, IC700-2 turns on, TR702~703 turn off regardless of the REC status, TR705 turns on and the motor runs.

Running Out of Paper

The micro-switch SS-5GL2 opens/closes together with the head. When the head is set to the recording position, the switch closes. The photo-reflector in UP-7644 senses the paper status. When the paper is loaded and the head is set, the light is reflected with the paper and the output NOPAPER becomes low. The NOPAPER is sent to the host CPU.

The schematic diagram illustrates a power supply and signal conditioning circuit. Key components and connections include:

- Power Inputs:** +12V PFC and +5V.
- Regulators:** IC701 (78M05) for +12V regulation and IC703 (78L05) for +5V regulation.
- Op-Amp:** IC704 (741C) configured as a buffer or amplifier.
- Hex Inverter:** IC702 (7410) used for signal inversion.
- Resistors:** R724 (2.2K), VR701 (2K), R723 (3.3K), R728 (10K).
- Capacitors:** C714 (0.1μ), C715 (0.1μ), C712 (22μ), C713 (22μ), C704 (1000μ), C705 (15000μ).
- Diodes:** D705 (1S953).
- Connectors:** CNP 607 (CRT BOARD) and CNP 710 (THERMAL HEAD).
- Labels:** ER, ED, END, CLK, STB, SIN, SOUT, TP701, TP702.

3.78

3-7 Power Unit SC-701V

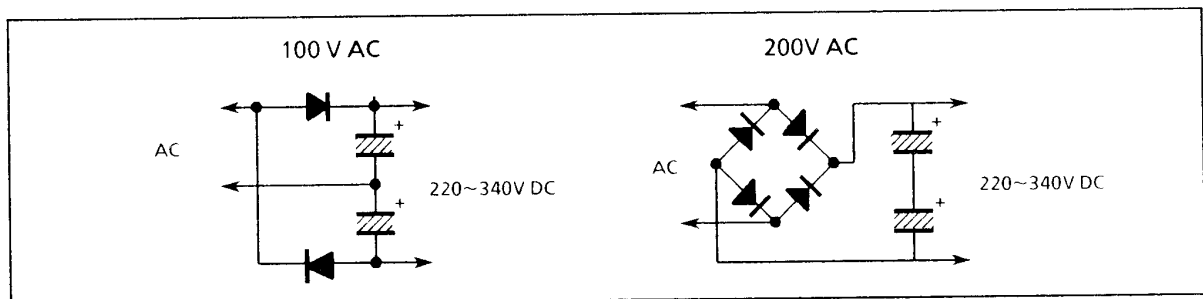
Outline

The switching regulator supplies the DC power to each unit from the AC source or the battery. The battery charger controls the charging voltage in the cycle or trickle mode.

AC Power Supply

The line filter CN801, L801~802 and C801~802 prevent the switching noise from interfering with external instruments connected to the AC line. The thermistor TH801~802 protects the circuit from a rush current. When the power is turned on, the impedance of the thermistors is high to impede a rush current. In steady state, the impedance decreases due to the temperature increase. The selector P802 and J802~803 select the voltage of the AC power source of 100V (90~135V) and 200V (180~265V). In 100V position, the circuit becomes the voltage doubler rectifier. In 200V position, the circuit becomes the bridge rectifier as shown below.

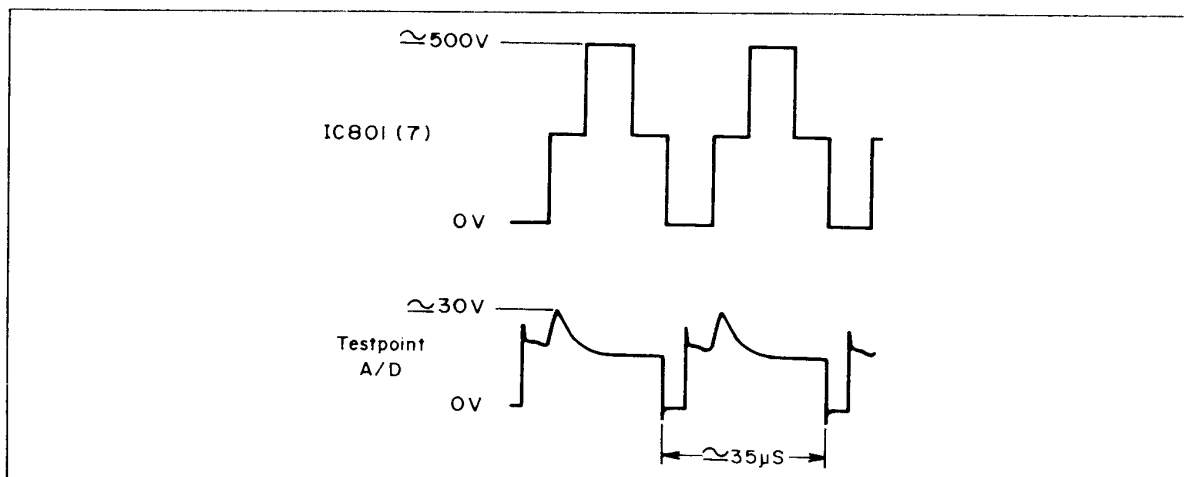
Rectifier Selection



3. THEORY OF OPERATION

AC/DC Switching Control

The switching regulator IC801 is powered by Q801 to initiate an oscillation when the power is turned on and by T801 through D807~808 in steady state. IC801 switches Q804~805 and Q802~803 alternately to chop the power supply voltage which appears across C803 and C804 in the half-bridge method. The output voltage is regulated by PWM method by the feedback voltage to IC801 (12). When IC801 (7) is low, Q805 turns on, Q803 turns on through T804, the voltage across C804 is chopped and the pulses are transferred to the secondary winding circuit through T801.



Relay Control

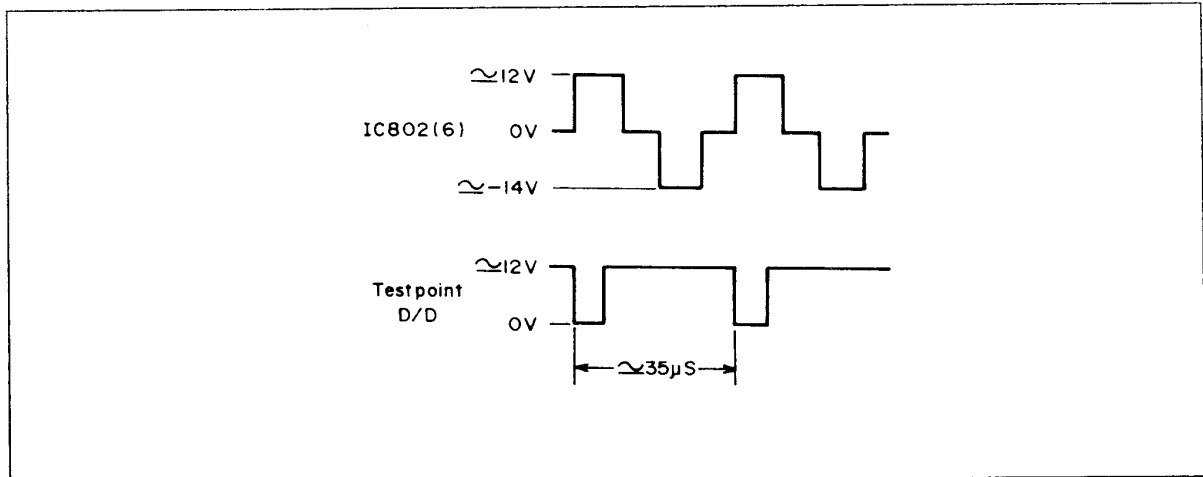
RY801 selects the power source of AC or the battery. RY802 turns on/off the power. When the AC source is available, the anode of D810 is high, Q806 turns on and the AC is selected. The signal AC of J804 (18) also becomes high and is sent to the host CPU. When the signal AC is low, +12VB of J804 (19) is A/D converted and monitored as the battery level by the host CPU. When the battery's level is lower than the operating voltage, the host CPU makes the BATOFF of J804 (17) high. RY802 is controlled by the POWER (from the energy selector), BATOFF, and AC of IC803 (12). The logic for RY802 is shown below.

Power on/off and AC/Battery Relay Control

POWER J804 (20)	1	0	0	0	0	0: Power on
IC803 (12)	X	0	0	1	1	1: AC is available
BATOFF J804 (17)	X	1	0	0	1	1: Battery is off
AC/BAT selector RY801	BAT	BAT	BAT	AC	AC	-----
Power on/off RY802	OFF	OFF	ON	ON	ON	-----

DC/DC Switching Control

Q807~808 switched by IC802 chops the rectified voltage. The pulse width of the chopped waveform regulates the output voltage by a feedback of +5V to IC802 (12). When the power on/off relay closes, the power is supplied through D815 to IC802 and an oscillation starts. Pulses transferred through T802 are rectified to provide $\pm 6V$, $\pm 8.5V$, $+5V$, $+12V_{REC}$, $+12V_{CRT}$ and $+12VB$. $\pm 6V$ and $+12V_{CRT}$ are regulated by series regulators IC807~809 and $+5V$ is regulated by a switching regulator IC802.



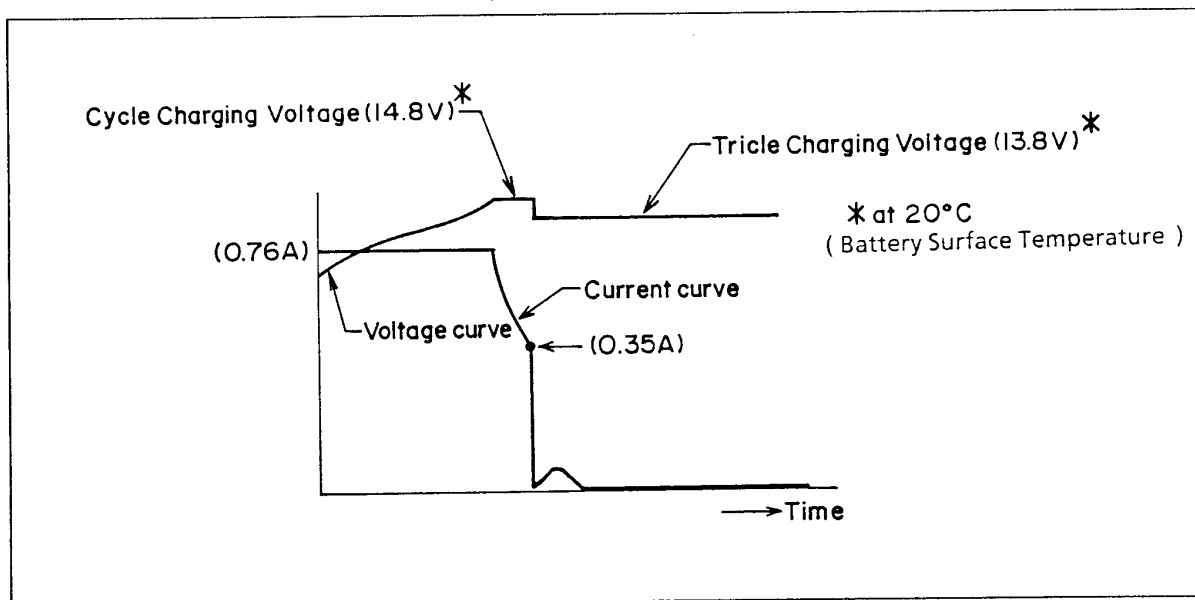
3. THEORY OF OPERATION

Battery Charger

The charger controls the charging mode of cycle and trickle. In the cycle mode, a large charging current rapidly charges the battery. When the battery is fully charged, the charging current is reduced to the minimum level to keep the battery fully charged.

The voltage regulator IC805 regulates the battery voltage in two steps. When charging starts (cycle mode), the regulation level is set to 14.8V (20°C). IC805 supplies a limited current of 760 mA to increase the voltage. The voltage across R849 is sensed by IC805 (2) and (3) to monitor the current level. When the battery level becomes the regulation level of 14.8V, the level is sensed by (4), the voltage is regulated and the charging current decreases gradually. When the charging current decreases to 350 mA, IC806 provides a low output to IC805 (5) to change the regulation level to 13.8V (20°C) and the current decreases to several mA for trickle charging. The regulation voltage depends on the battery surface temperature. The voltage in the trickle mode is 14.1V at 0°C, 13.8V at 20°C and 13.4V at 40°C.

Battery Charging Characteristics



Battery Charge Indication

(UP-7640)

When the AC power is supplied, the AC power switch is turned on, and the battery is in place in the defibrillator, the BATTERY lamp lights. The battery presence is detected by the switch connected to connector J808.

(UP-7720/7720G)

The BATTERY lamp lights in the cycle charge mode and goes off in the trickle mode. The lamp also goes off when the battery is not charged. The comparator IC10 monitors the battery charging current by the voltage across R884. When the charging current becomes less than approx. 25mA, the lamp goes off.

Section 4 SELF-CHECK

CONTENTS

	Page
4-1 Introduction	4.1
4-2 Error 1	4.2
4-3 Error 2, 3	4.3
4-4 Error 4	4.4

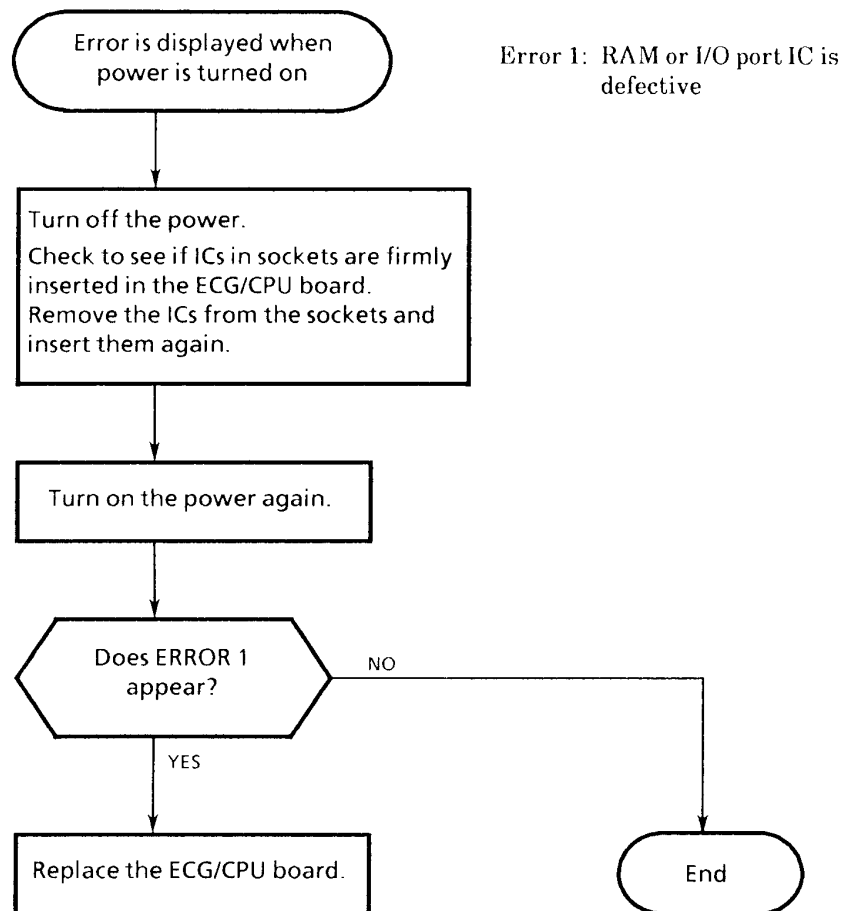
4-1 Introduction

The host CPU monitors the circuit operation and displays an error code on the screen when a malfunction is found according to the self-check program. Four types of error codes are provided.

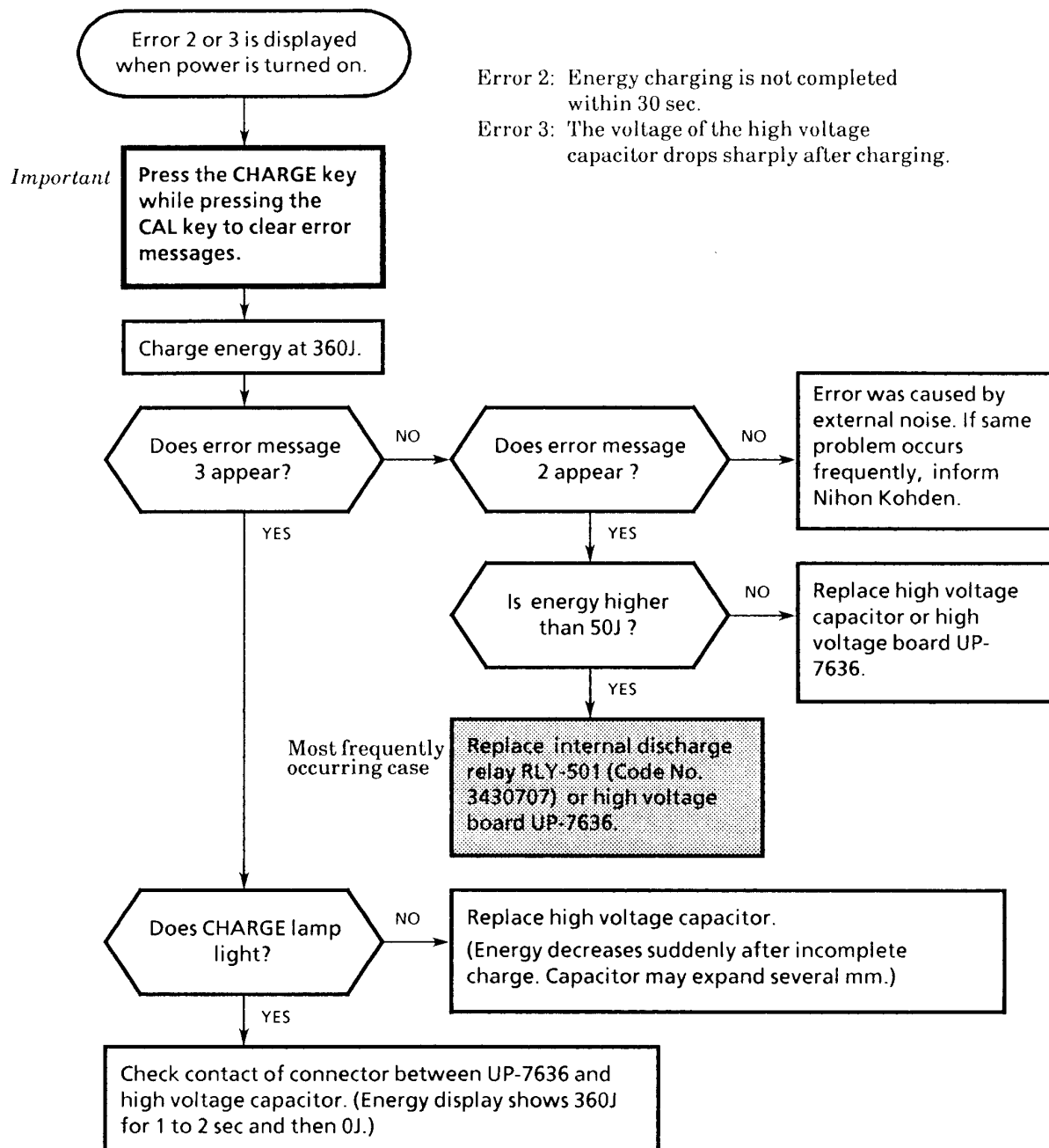
When the power is turned on, RAMs and the I/O port are checked. If a malfunction is found, "ERROR 1" is displayed with an alarm for 3 sec. If no trouble is found "READY" is displayed.

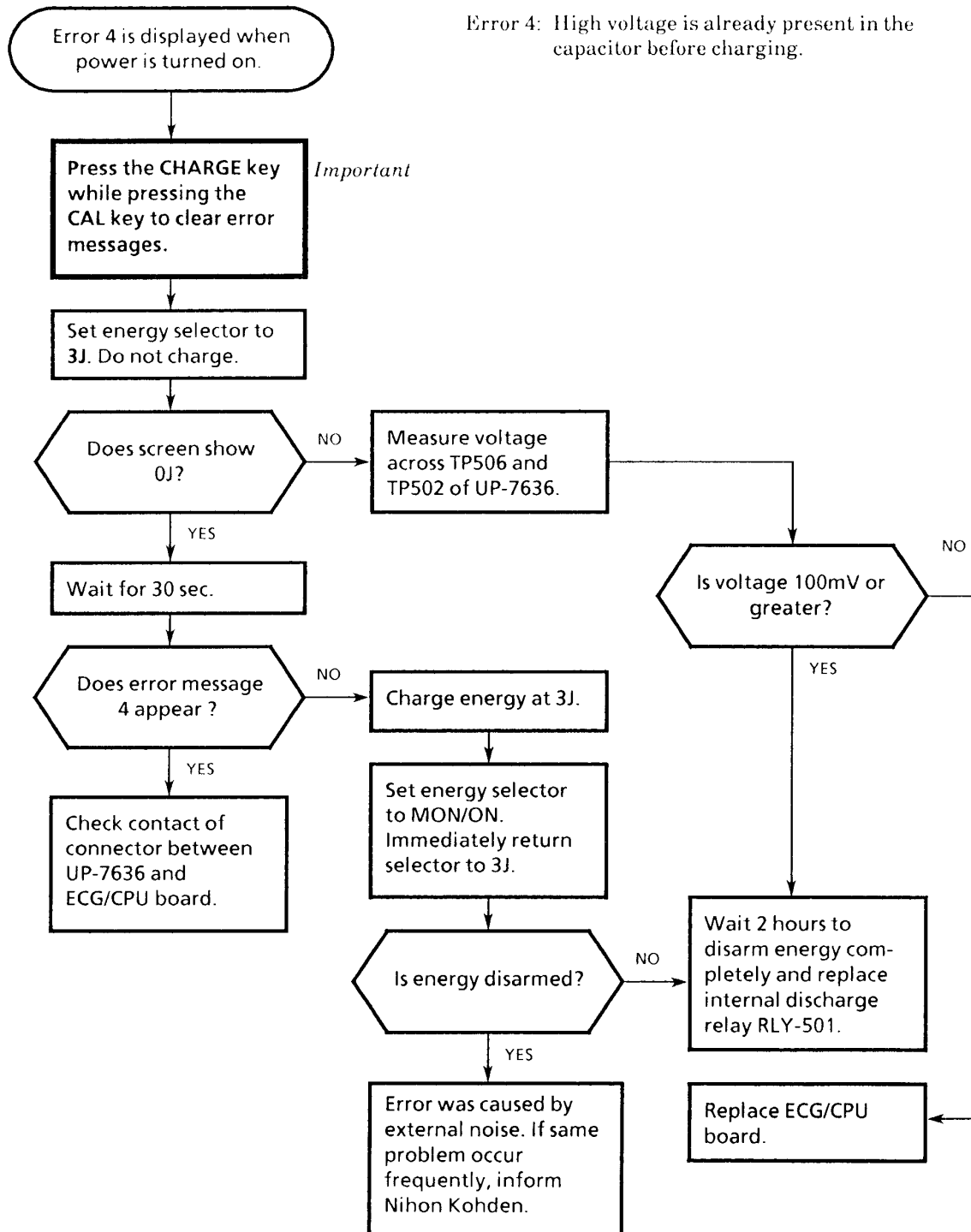
When the high voltage circuit is faulty, error 2, 3 or 4 is displayed and the CPU inhibits the energy charging operation for safety. These error messages are stored in the memory of the timer IC, which is backed up by the battery. Therefore, once the message appears, charging is impossible even after the power is turned off and on again. However, this error message may appear due to noise or poor contact of the connector. First clear the error message in the memory as shown in later to eliminate such faulty error messages.

4-2 Error 1



4-3 Error 2, 3



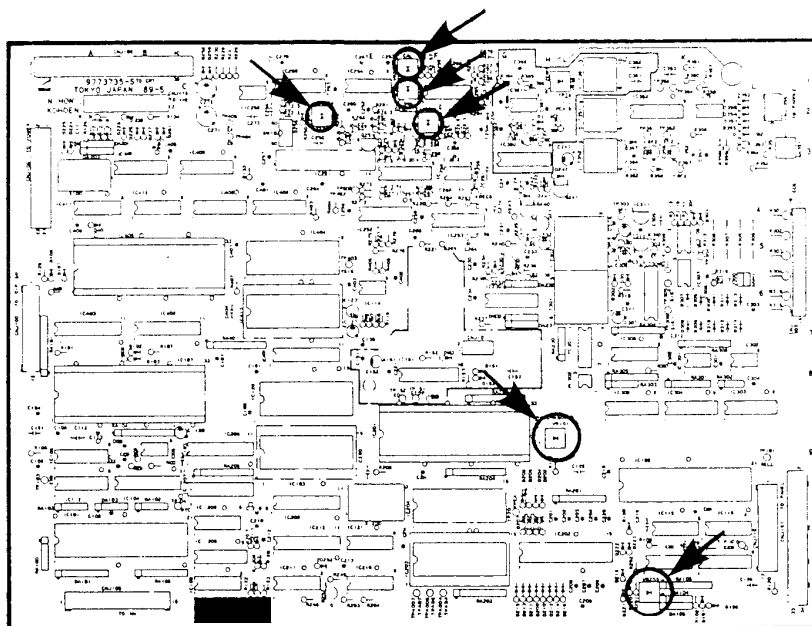
4-4 Error 4

Section 5 ADJUSTMENTS

CONTENTS

	Page
5-1 ECG / CPU Board UP-7635/76351/7737	5.1
5-1-1 Charging Completion Sound	5.1
5-1-2 Reference Voltage	5.2
5-1-3 ECG Amplifier Gain	5.2
5-1-4 Amplitude of Calibration Waveform	5.3
5-1-5 Amplitude of Test Signal	5.3
5-1-6 Paddle Contact Indicator	5.3
5-1-7 Battery Level Indicaator	5.3
5-2 Switching Regulator UP-7640/7720	5.4
5-2-1 Power Supply Voltage +12VB	5.5
5-2-2 Power Supply Voltage +5V	5.6
5-2-3 +5V Current Limter	5.6
5-2-4 Trickle Charging Voltage	5.7
5-2-5 Maximum Charging Current	5.8
5-2-6 Current Change from Cycle Charge to Trickle Charge	5.9
5-3 High Voltage Board UP-7636/7851	5.10
5-3-1 Delivered Energy	5.10
5-3-2 Energy Charging Time	5.12
5-3-3 TTR Gain Adjustment (TEC-7200/7300)	5.12
5-3-4 Delivered Energy Display (TEC-7200/7300)	5.13
5-4 CRT Display UP-7740	5.14
5-4-1 Pattern Distortion and Sweep Rotation	5.14
5-4-2 Waveform and Character Position	5.15
5-4-3 Sub Intensity	5.16
5-4-4 Focus	5.16
5-5 Motor Control Board UP-7738.....	5.17
5-5-1 Motor Rotation	5.17
5-5-2 Thermal Head Supply Voltage	5.18
5-6 Thermal Head Replacement & Alignment	5.19
5-6-1 Thermal Head Replacement	5.19
5-6-2 Thermal Head Alignment	5.19

5-1 ECG / CPU Board UP-7635/76351/7737



When replacing the CPU board, no adjustment is required as it has already been adjusted at the factory.

5-1-1 Charging Completion Sound Volume

Adjustment

Charge the energy at 3J and adjust VR101 as follows.

Preset control	Sound
VR101 (HR SOUND)	Maximum

5. ADJUSTMENT

5-1-2 Reference Voltage

Preparation

- 1. Set ENERGY SELECT switch to “ECG MON POWER ON” position.

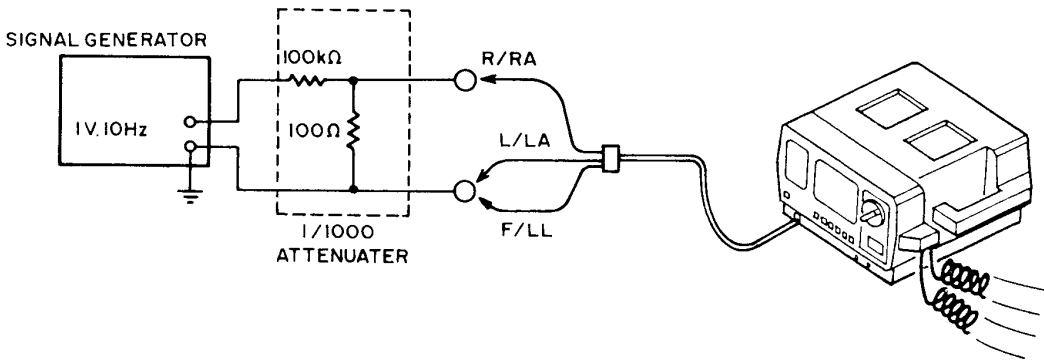
Adjustment

Preset control	Measuring point	Adjustment range
VR252 (REF4V)	TPREF	+ 4 ± 0.001V

5-1-3 ECG Amplifier Gain

Preparation

- 1. Input the sine wave of 10Hz/1mV p-p divided into 1/1000 of 1 Vp-p to the ECG input leads.
- 2. Select ECG LEAD (I) and sensitivity (×1).



Adjustment

Preset control	Adjustment
VR251 (GAIN)	10 mmp-p on paper

5-1-4 Amplitude of Calibration Waveform

This adjustment should be carried out after completing item 5-1-2.

Preparation

Select $\times 1$ by pressing SENS switch.

Adjustment

Press the CAL button located on the front panel.

Preset control	Adjustment
VR253 (CAL)	10 mm p-p on paper

5-1-5 Amplitude of Test Signal

Preparation

1. Select TEST mode by LEAD switch.
2. Select $\times 1$ by pressing SENS switch.

Adjustment

This adjustment should be carried out after completing item 5-1-2.

Preset control	Adjustment
VR254 (TEST)	10 mm p-p on paper

5-1-6 Paddle Contact Indicator

Preparation

Apply the resistor of the value as shown below between paddle electrodes.

Adjustment

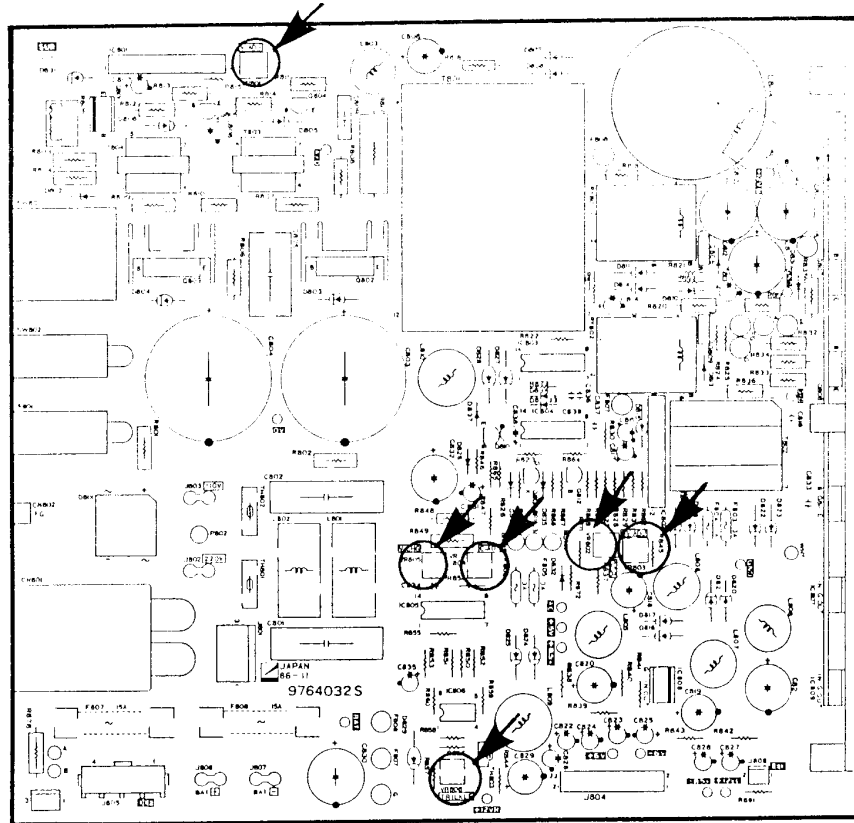
Preset control	Color of paddle contact indicator
VR381 (PC ZERO)	Threshold level of Green and Yellow (100 Ω resistor) Threshold level of Yellow and Red (200 Ω resistor)

5-1-7 Battery Level Indicator

Adjustment

Preset control	Measuring point	Adjustment
VR525	IC202 pin-28	Voltage at CNJ108 pin-19 $\times 0.2$

5-2 Switching Regulator UP-7640/7720



When changing the switching regulator board, readjustments of VRs are not required.

CAUTION

1. Do not touch AC primary circuit with one's hand.
2. When testing AC primary circuit by the oscilloscope, a power supply isolated from AC line voltage is required.
3. Do not use the test terminal 0V to check all of the secondary circuits, because this 0V terminal is applied to the SC line voltage directly. This 0V test terminal must be used for checking the AC primary circuit only.

5-2-1 Power Supply Voltage + 12 VB

DC +12 VB is mainly used for high voltage circuits. This power supply is output from the AC-DC inverter circuit of this unit.

Preparation

Set the ENERGY SELECT dial to "360J" position.

Adjustment

Press the CHARGE key. After charging is completed, adjust VR801.

Preset control	Measuring point	Adjustment range
VR801 (V.ADJ)	TP + 12VB	+ 12 $\pm$ 0.1 V

5. ADJUSTMENT

5-2-2 Power Supply Voltage + 5V

+5VDC output from DC-DC converter is used for the digital circuit.

Preparation

When adjusting the to +5V, the output current load is required. Set the ENERGY SELECT switch to ECG MON POWER ON position to provide DC +5V power supply with the proper current load during adjustment. The 15 Ω / 2W resistance also provides the equivalent current load for this power supply.

Adjustment

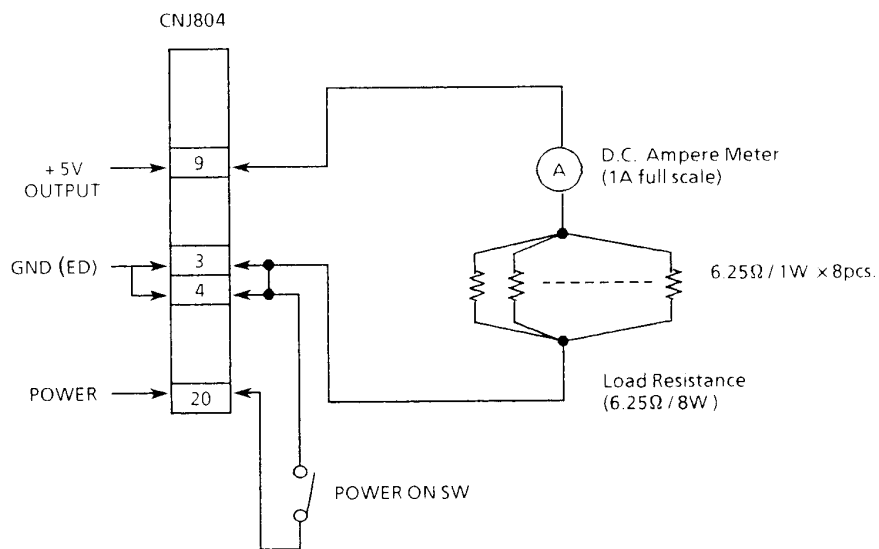
Preset control	Measuring point	Adjustment range
VR803 (5V ADJ)	TP + 5V	+ 5.03 $\pm$ 0.05 V

5-2-3 + 5V Current Limiter

When excessive current is loaded to the +5V power supply due to some circuit troubles, the output current is limited with 800mA.

Preparation

1. Disconnect connector CNP108 from the P.C.B. (UP-7640).
2. Connect the load resistor and D.C. ampere meter between pin number ⑨ (+5V) and ③, ④ (GND) of CNJ804 as shown below.
3. Connect the power switch between ③, ④ and ⑳ as shown below.



The load resistance can be equally provided by using the eight resistors of 50Ω / 1W instead of the one resistor of 6.25Ω / 8W.

Adjustment

Adjust the VR802 so that an ampere meter indicates 800mA.

Preset control	Measuring point	Adjustment value
VR802 (OCP)	See Fig.	800mA

5-2-4 Trickle Charging Voltage

Battery charging circuit has two charging modes. Charging voltages are independently provided to each mode. It is only necessary to adjust the trickle charging voltage according to the following procedures.

Preparation

1. Remove the top casing.
2. Remove the power unit shield cover.
3. Use the fully charged battery when adjusting the trickle charging voltage.

Adjustment

The voltage depends on the ambient temperature.

Preset control	Measuring point	Adjustment range
VR805 (V.CHG)	TPBAT	$13.88 \pm 0.01V$ *Ta = 25°C

*Ta = Ambient Temperature

5. ADJUSTMENT

5-2-5 Maximum Charging Current

It is necessary to adjust the maximum charging current according to the following procedures.

Test Circuit

Connect the D.V.M. between across the resister R849. The measuring current can be obtained by the following equation.

$$\text{Charging limit current} = \frac{\text{Indicated value of D.V.M.(V)}}{1\Omega} \text{ (A)}$$

Adjustment

During charging the battery, adjust VR804.

Preset control	Measuring point	Adjustment value
VR804 (C.ADJ)	Across R849	0.76 V

5-2-6 Current Change from Cycle Charge to Trickle Charge

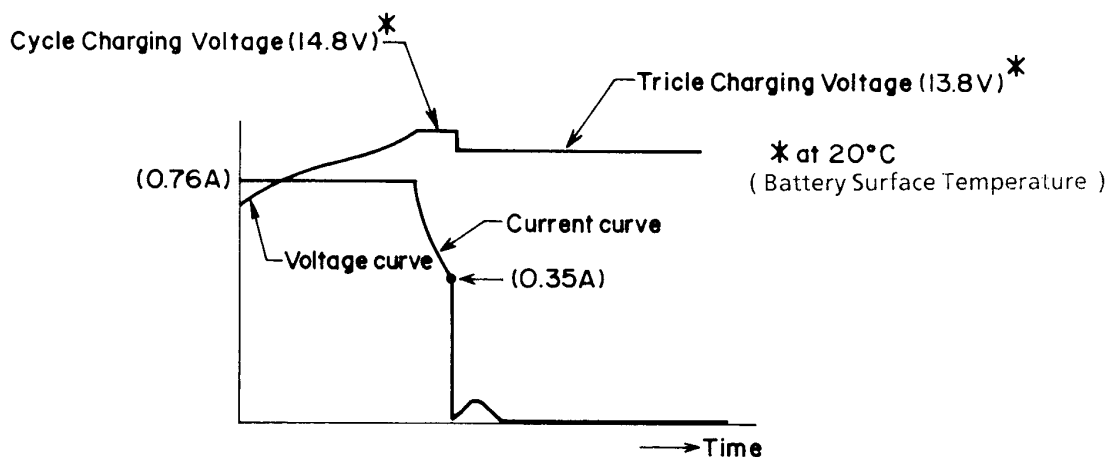
When a current of 0.35A is detected, the charging mode is changed from cycle mode to trickle mode as shown in the Fig. 5-2-5 and charging current is rapidly decreased.

Adjustment

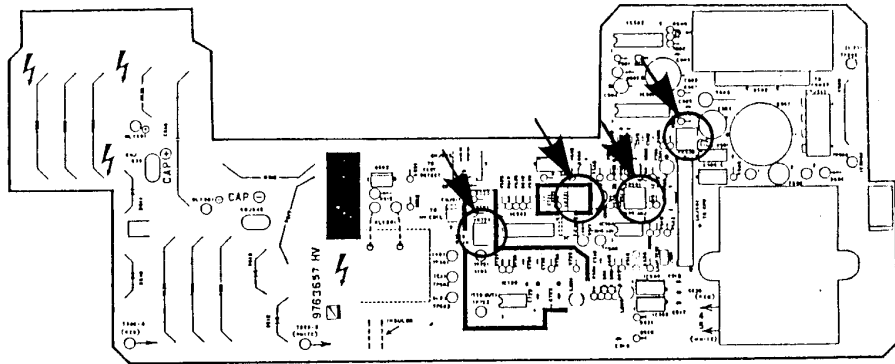
1. Charge the battery fully. An empty battery requires approx. 15 hours to charge completely.
2. Turn off the power by the AC POWER switch.
3. Turn on the power.
4. Monitor the voltage across R849. Constant voltage of 0.76V appears for a while, then the voltage starts decreasing gradually, if adjusted correctly. When the voltage becomes 0.35V, the voltage drops rapidly. If the voltage does not drop at 0.35V, repeat the procedure 2 and 3, adjust VR806, and monitor the voltage.

Preset control	Measuring point	Adjustment value
VR806 (TRICKLE)	Across R849	Constant at 0.76V Drops at 0.35V

Battery Charging Characteristics



5-3 High Voltage Board UP-7636/7851

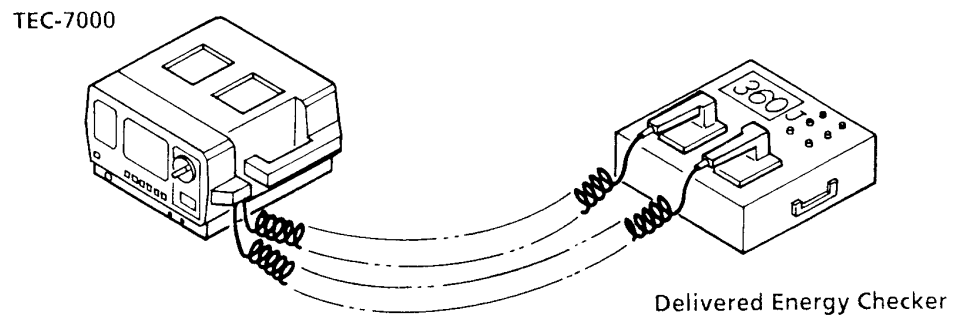


The following adjustments are for the energy charge and discharge circuit of defibrillation.

5-3-1 Delivered Energy

Preparation

Connect the equipment as shown below.



Adjustment Procedure

1. Select an energy of 360 J and charge the energy.
2. Press discharge buttons to deliver the energy to the checker.
3. If the checker does not show $360 \text{ J} \pm 10\%$, adjust VR501 and repeat the above procedures.
4. Confirm that the values of other energy levels are in the following range. If not, adjust VR501 so that the checker shows 1 ~ 2 J over the previous level of 360 J.

Selected Energy Level (J)	Delivered Energy Joule Meter	
	TEC-7100/7200/7300A	Other than TEC-7100/7200/7300A
3	$3 \text{ J} \pm 1 \text{ J}$	$3 \text{ J} \pm 1 \text{ J}$
5	$5 \text{ J} \pm 2 \text{ J}$	$5 \text{ J} \pm 2 \text{ J}$
10	$10 \text{ J} \pm 2 \text{ J}$	$10 \text{ J} \pm 2 \text{ J}$
20	$20 \text{ J} \pm 10 \%$	$20 \text{ J} \pm 15 \%$
30	$30 \text{ J} \pm 10 \%$	$30 \text{ J} \pm 15 \%$
50	$50 \text{ J} \pm 10 \%$	$50 \text{ J} \pm 15 \%$
70	$70 \text{ J} \pm 10 \%$	$70 \text{ J} \pm 15 \%$
100	$100 \text{ J} \pm 10 \%$	$100 \text{ J} \pm 15 \%$
150	$150 \text{ J} \pm 10 \%$	$150 \text{ J} \pm 15 \%$
200	$200 \text{ J} \pm 10 \%$	$200 \text{ J} \pm 15 \%$
300	$300 \text{ J} \pm 10 \%$	$300 \text{ J} \pm 15 \%$
360	$360 \text{ J} \pm 10 \%$	$360 \text{ J} \pm 15 \%$

5. ADJUSTMENT

5-3-2 Energy Charging Time

Adjustment

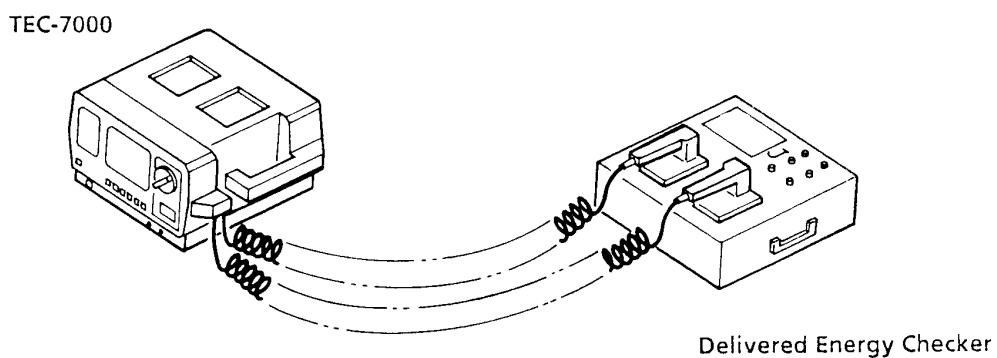
1. Operate the equipment on the AC line.
2. Select an energy of 360 J and charge the energy.
3. If charging time (after pressing the charge button until charging is completed) is out of 9.3~9.7 sec., adjust VR500 and repeat the above procedure.

Preset control	Adjustment range
VR500 (CHG TIME)	9.3 ~ 9.7 sec

5-3-3 TTR Gain (TEC-7200/7300)

Preparation

Connect the equipment as shown below.



Adjustment

1. TEC-7200

(1) Press the HI / LO LIMITS key while pressing the $\uparrow$ key.

(2) Press REC / STOP key while pressing the $\uparrow$ key.

The TTR and delivered energy level will then be displayed on the heart rate position and set energy position, respectively.

TEC-7300

Press both CAL and FREEZE key simultaneously.

The TTR and delivered energy level will then be displayed on the heart rate position and set energy position, respectively.

2. Select an energy of 50 J and charge the energy.
3. Press discharge buttons to deliver the energy to the checker.
4. If the displayed TTR is not $50 \pm 1 \Omega$, adjust VR720 and repeat procedures 3 and 4.

Preset control	Adjustment range
VR720 (TTR GAIN)	$50 \pm 1 \Omega$ on CRT

5-3-4 Delivered Energy Display (TEC-7200/7300)

Preparation

Connect the equipment as shown in Fig. 5-3-3.

Adjustment

1. TEC-7200

(1) Press the HI / LO LIMITS key while pressing the $\uparrow$ key.

(2) Press REC / STOP key while pressing the $\uparrow$ key.

The TTR and delivered energy level will then be displayed on the heart rate position and set energy position, respectively.

TEC-7300

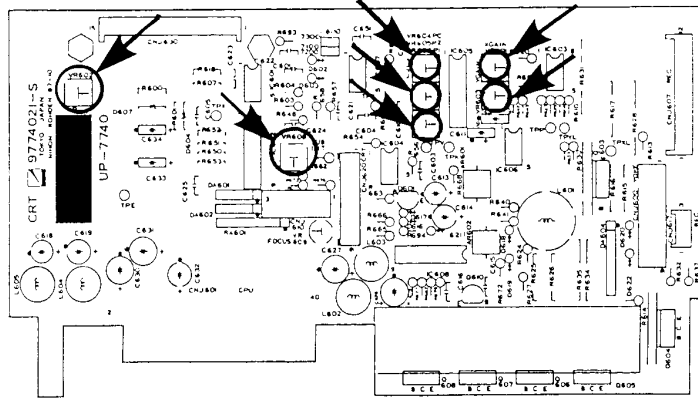
Press both CAL and FREEZE key simultaneously.

The TTR and delivered energy level will then be displayed on the heart rate position and set energy position, respectively.

2. Select an energy of 50 J and charge the energy.
3. Press discharge buttons to deliver the energy to the checker.
4. If the displayed energy is not $50 \pm 1J$, adjust VR721 and repeat procedures 3 and 4.

Preset control	Adjustment range
VR721 (TTR ENRG)	$50 \pm 1J$ on CRT

5-4 CRT Display Adjustment UP-7740

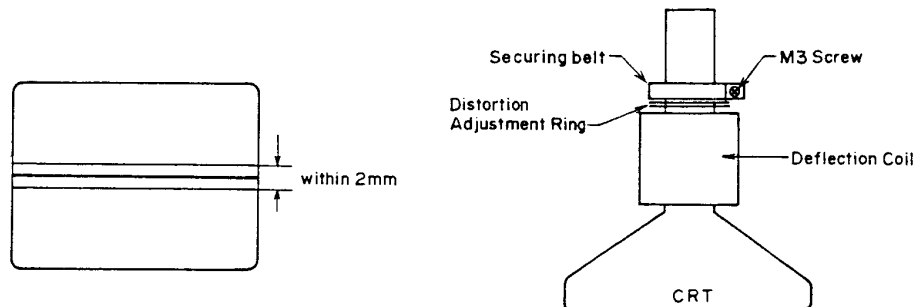


This adjustment is required when changing the deflection coil or the CRT tube. When changing each printed circuit board, this adjustment is not necessary.

5-4-1 Pattern Distortion and Sweep Rotation

Pattern Distortion Adjustment

1. Adjust the distortion adjustment ring mounted on the deflection coil so that the display pattern is placed on a specified position of the CRT screen. (See the following figure.)
2. Adjust the distortion adjustment ring so that no distortion occurs around the corner of the CRT screen.



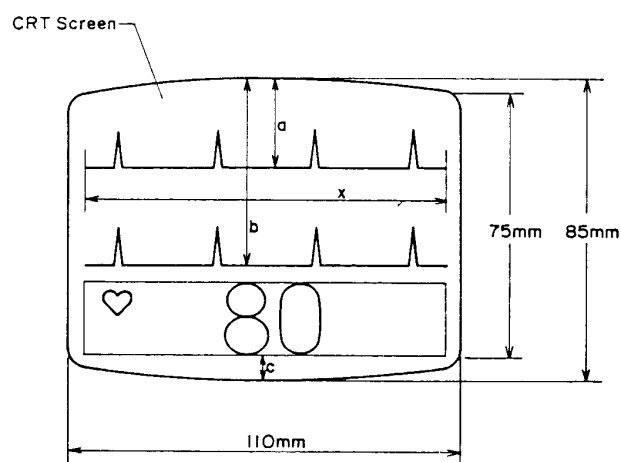
Sweep Rotation Adjustment

1. Loosen the M3 screw mounted on the securing belt.
2. Turn the deflection coil so that a sweep is positioned within a specified area.
3. Secure the M3 screw to fix the deflection coil.

5-4-2 Waveform and Character Position

Adjustment

1. Display the TEST wave by selecting TEST mode.
2. According to the adjustment table described below, adjust the position of the waves and the characters. The symbols, a,b,c and x used in the table are specified as shown below.



Item	Preset control	Adjustment
Sweep Length	VR601 (XGAIN)	X : 102 ± 5 mm
Sweep Horizontal Position	VR602 (X P)	Center of CRT Screen
Character Displat Position	VR604 (PC)	c : 7 ± 1 mm
Trace 2 Veritcal Position	VR605 (P2)	b : 48 ± 1 mm
Trace 1 Vertical Position	VR606 (P1)	a : 25 ± 1 mm
Signal Amplitude on CRT Screen *	VR603 (YGAIN)	10 ± 1 mm on the CRT screen

*Test Circuit

Input the signal of 1 mV / 10Hz to the ECG input cable as shown in Fig. 5-1-2 after confirming the gain of the ECG amplifier is adjusted.

5. ADJUSTMENT

5-4-3 Sub Intensity

Adjustment

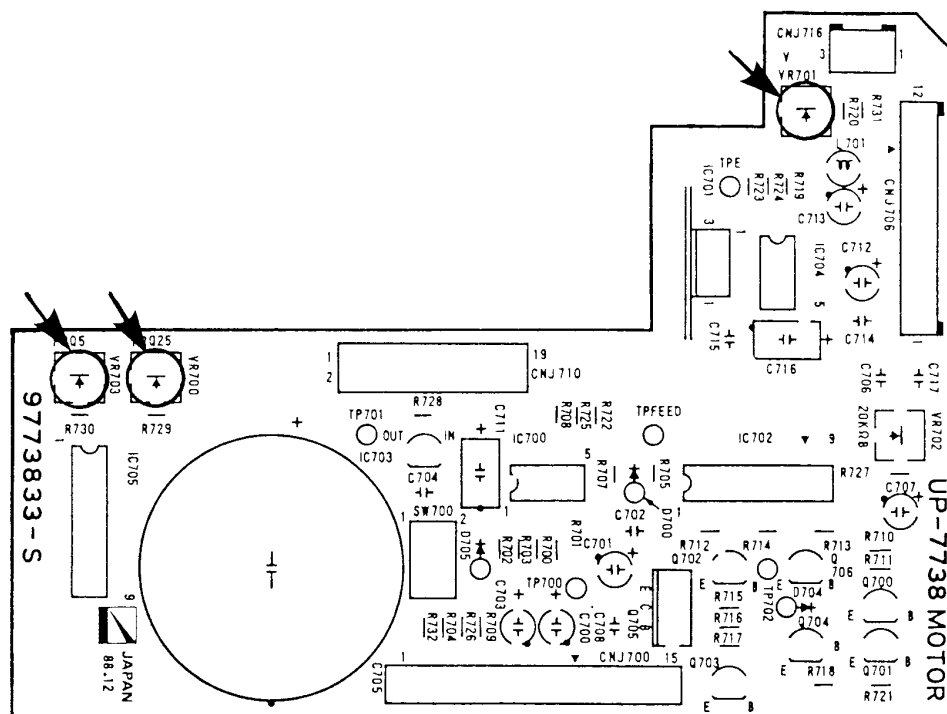
1. Turn the INTENSITY knob fully clockwise.
2. Adjust VR608 so that the raster disappears while the characters are displayed at maximum intensity.

5-4-4 Focus

Adjustment

1. Select the TEST waveform with the LEAD key.
2. Select the synchronized mode with the SYNC key.
3. Adjust VR609 so that the synchronized spot is displayed while characters are not out of focus.

5-5 Motor Control Board UP-7738



5-5-1 Motor Rotation

Re-adjustment of this motor rotation is required only when changing the motor and not required when changing the PCB (UP-7648).

Adjustment

Press the REC/STOP key to start recording the test waveform, adjust the VR700 so that the interval between QRSs on the recording paper becomes 25 ± 2 mm.

Preset control	Measuring point
VR700 (FREQ 25)	Interval between QRSs on paper: 25 ± 2 mm
VR703 (FREQ 5) (TEC-7300 only)	Interval between QRSs on paper: 5 ± 0.7 mm

5. ADJUSTMENT

5-5-2 Thermal Head Supply Voltage

CAUTION

Do not supply a voltage exceeding the specified head supply voltage to protect the thermal head element.

This adjustment is required when PCB of UP-7738 or the thermal head is replaced.

Adjustment

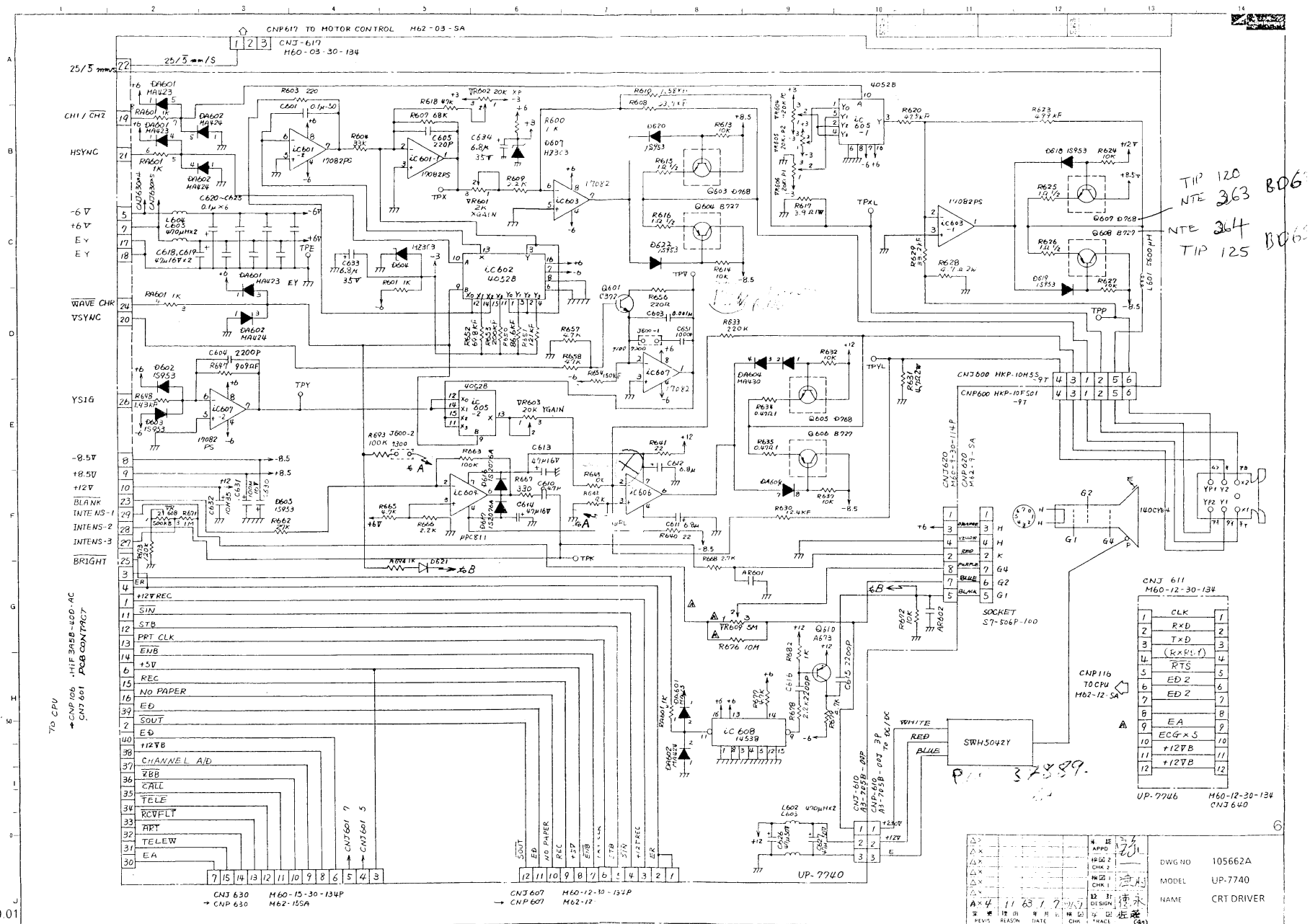
Adjust the VR701 so that the D.V.M. indicates the voltage shown in the following table.

The head resistance is indicated by the sticker attached on the thermal head.

Head resistance	Vth
132 ~ 139	7.9 ~ 8.0
140 ~ 149	8.0 ~ 8.2
150 ~ 159	8.2 ~ 8.4
160 ~ 169	8.4 ~ 8.6
170 ~ 179	8.6 ~ 8.8
180 ~ 189	8.8 ~ 9.0
190 ~ 199	9.0 ~ 9.1
200 ~ 209	9.1 ~ 9.3
210 ~ 219	9.3 ~ 9.5
220 ~ 229	9.5 ~ 9.7
230 ~ 239	9.7 ~ 9.8
240 ~ 249	9.8 ~ 10.0
250 ~ 260	10.0 ~ 10.2

Note: In TEC-7100/7200/7300C, increase the Vth by 1.1 times.
(Ex. 132~139 Ω : 8.7~8.8 V)

Preset control	Measuring point	Adjustment range
VR701 (V)	TP701	7.9 ~ 10.2 V (Vth)



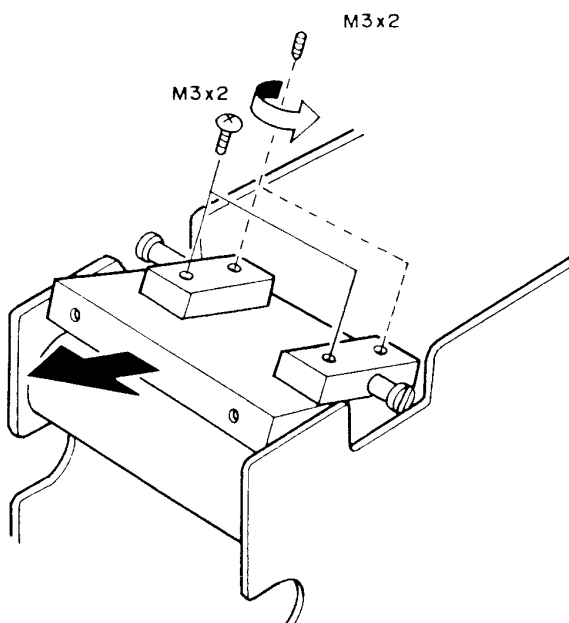
5-6 Thermal Head Replacement & Alignment

Thermal head supply voltage adjustment is required when the head is replaced.

5-6-1 Thermal Head Replacement

?!N: 1844463 (\$481-32+)
4/8/98

1. Remove the main unit's upper casing, as described in section 5-1.
2. Remove the recorder, as described in section 5-2.
3. Slightly loosen the two set-screws of the thermal head.
4. Remove the two screws securing the thermal head to the recording unit.
5. Remove the thermal head as shown below.
6. Replace the old thermal head with a new one, and do the opposite of steps 2. through 5. in reverse order.
7. Align the thermal head, as described in section 5-6-2.



5-6-2 Thermal Head Alignment

1. If the main unit's upper casing has yet to be removed, remove it referring to section 5-1.
2. Make a sample recording, and determine whether or not the density of the printing is even. If the density on the left side is light, turn the recorder on, and slightly turn the left set-screw clockwise until the density is even with the right side.
3. Replace the upper casing by doing the opposite of steps 1) through 3) in section 5-1 in reverse order.

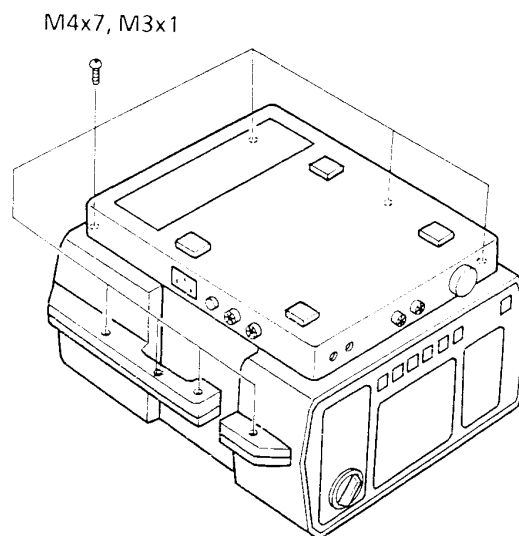
Section 6 DISASSEMBLY

CONTENTS

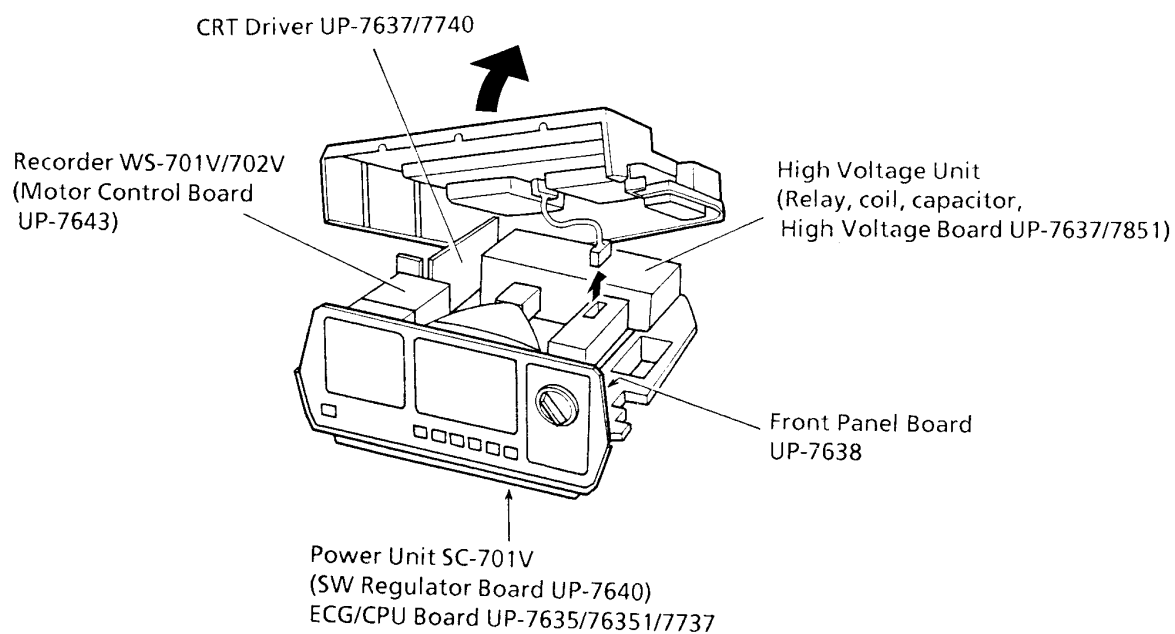
	Page
6-1 Upper Casing (Location of Units)	6.1
6-2 Recorder WS-701V/WS-702V	6.2
6-2-1 Speaker Unit	6.2
6-2-2 Thermal Head	6.3
6-2-3 Motor	6.3
6-2-4 Timing Belt	6.3
6-2-5 Photosensor	6.4
6-2-6 Platen	6.4
6-3 High Voltage Section	6.5
6-3-1 Energy Capacitor, Coil and External Discharge Relay	6.5
6-3-2 High Voltage Board UP-7636/7851	6.5
6-3-3 Internal Discharge Relay	6.5
6-4 Front Panel Assembly	6.6
6-4-1 CRT	6.6
6-4-2 Front Panel Board UP-7638	6.6
6-5 Paddle / Paddle Connector Receptacle	6.7
6-5-1 Paddle ND-701V (TEC-7100)	6.7
6-5-2 Paddle Connector Receptacle (TEC-7200/7300)	6.7
6-6 Lower Casing	6.8
6-7 Power Unit SC-701V (SW Regulator Board UP-7640/7720)	6.9
6-8 ECG /CPU Board UP-7635/76351/7737	6.9
6-9 VR and Connector Board UP-7639 & ECG Input Connector	6.10

6-1 Upper Casing (Location of Units)

1. Remove the seven M4 and one M3 screws on the bottom of the main unit and handle.

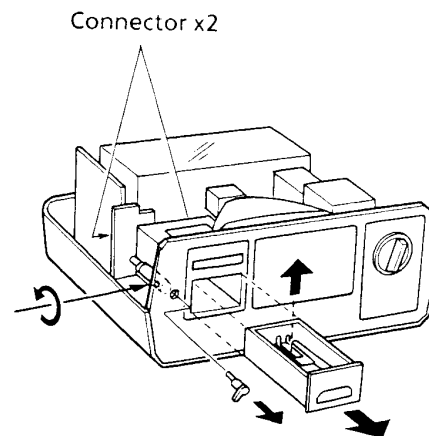


2. Placing the instrument right side up, lift up the upper casing, and disconnect the connector.

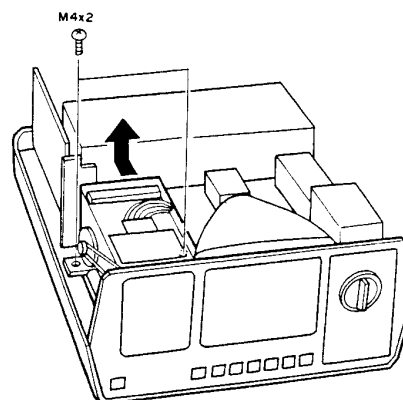


6-2 Recorder WS-701V/702V

1. Remove the upper casing as shown in section 6-1.
2. Take out the paper tray while pressing the stopper in the tray upward.
3. Loosen the M3 set-screw in the lever shaft using an allen wrench, and take out the lever.
4. Disconnect the two connectors.

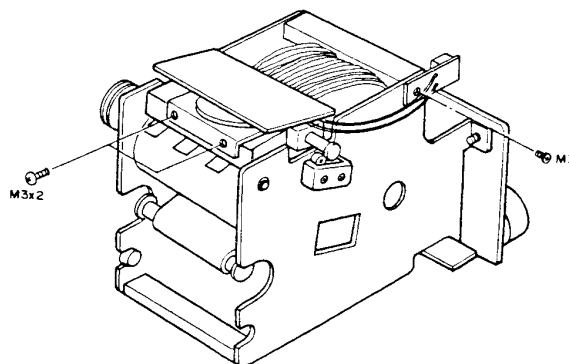


5. Remove the two M4 screws.
6. Pulling the recorder backward, lift it up.



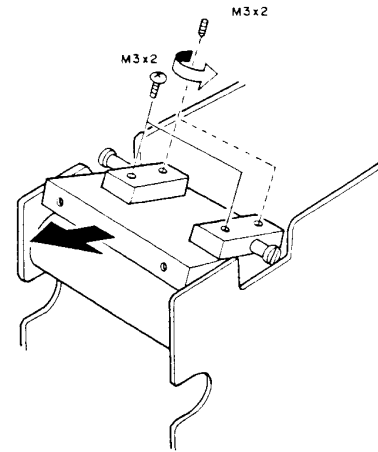
6-2-1 Speaker unit

7. Remove the three M3 screws.



6-2-2 Thermal Head

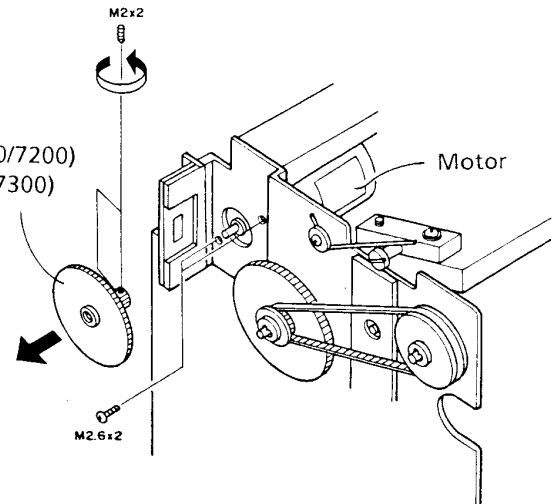
7. Remove the speaker unit as shown in section 6-2-1.
8. Remove the two M3 screws.
9. Loosen the two M3 set-screws.



6-2-3 Motor

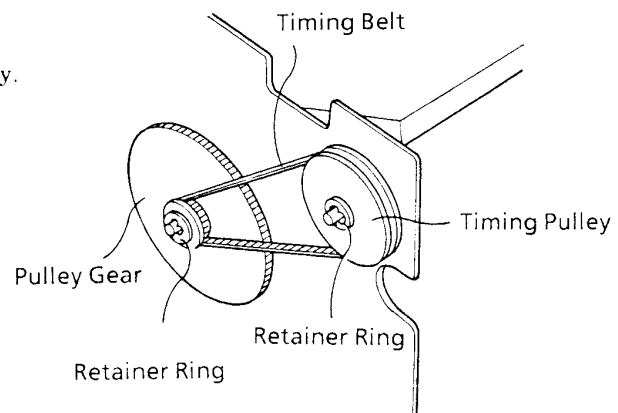
7. Remove the two set-screws.
8. Remove the gear assy.
9. Remove the two M2.6 screws.

Motor Gear (TEC-7100/7200)
Rotary Encoder (TEC-7300)



6-2-4 Timing Belt

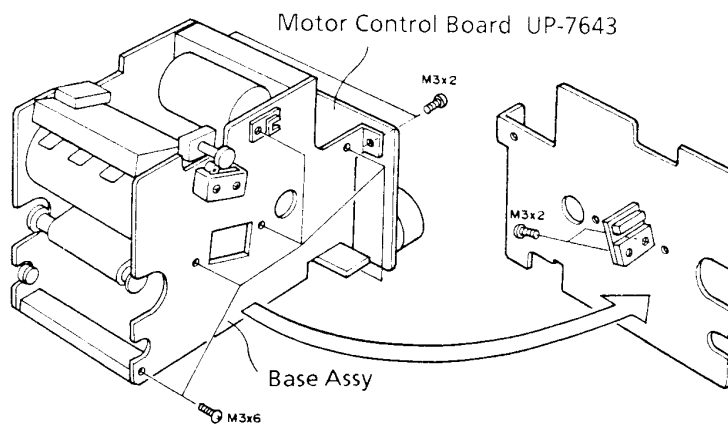
7. Remove the two retainer rings.
8. Remove the pulley gear and timing pulley.



6. DISASSEMBLY

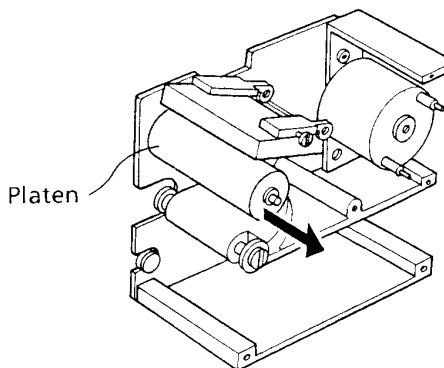
6-2-5 Photosensor

7. Remove the two M3 screws on the motor control board UP-7738.
8. Remove the six M3 screws on the side panel of the recorder.
9. Remove the two M3 screws on the photosensor behind the panel.



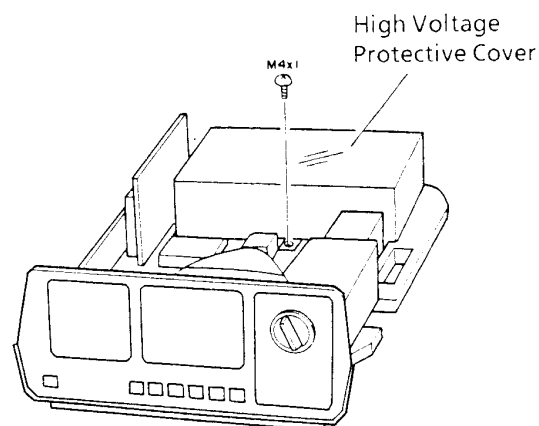
6-2-6 Platen

7. Remove the side panel of the recorder as shown in the step 7 and 8 of section 6-2-5.
8. Remove the motor gear and timing pulley as shown in section 6-2-4.



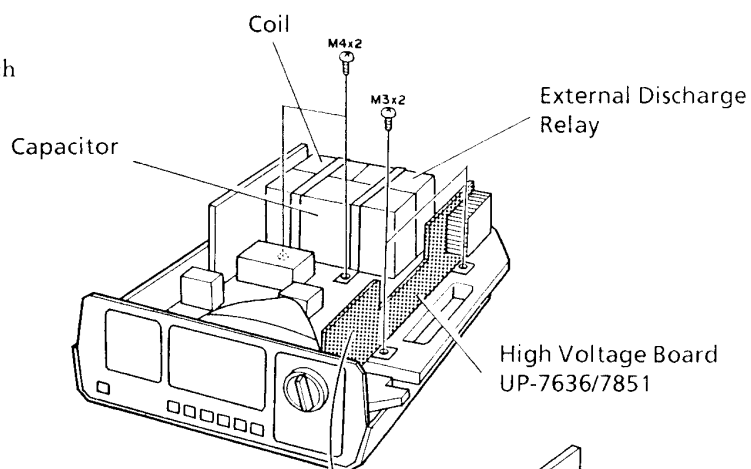
6-3 High Voltage Section

1. Remove the upper casing as shown in section 6-1.
2. Remove the M4 screw.
3. Lift up the cover.



6-3-1 Energy Capacitor, Coil and External Discharge Relay

4. Remove the two M4 screws.
5. Loosen the securing belt.
6. Disconnect the connectors to remove each component.

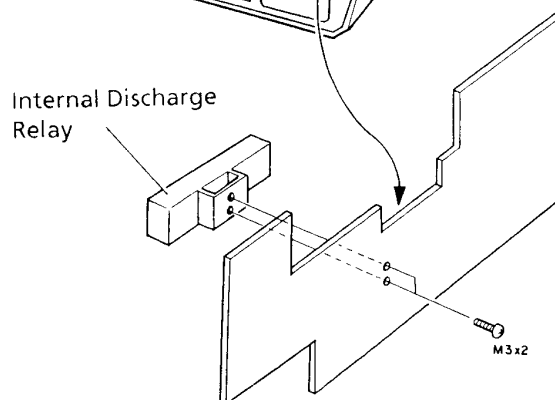


6-3-2 High Voltage Board UP-7636/7851

4. Disconnect the connectors.
5. Remove the two M4 screws.
6. Lift up the board.

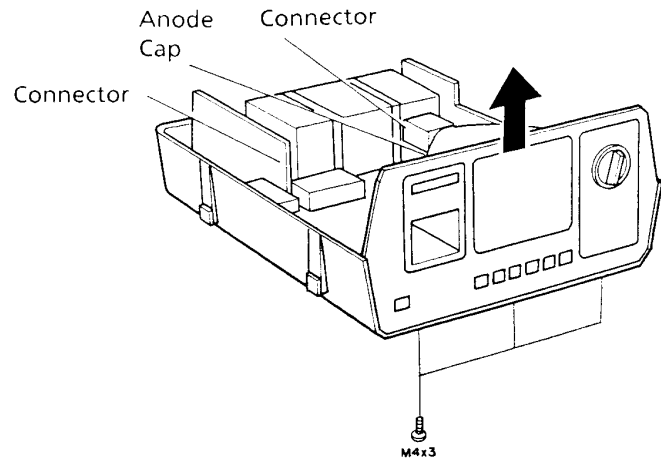
6-3-3 Internal Discharge Relay

4. Remove the high voltage board as shown in section 6-3-2.
5. Remove the two M3 screws.
6. Desolder the four leads.



6-4 Front Panel Assembly

1. Remove the upper casing as shown in section 6-1.
2. Remove the recorder as shown in section 6-2.
3. Disconnect the two connectors and anode cap.
4. Remove the three M4 screws.
5. Lift up the assembly.

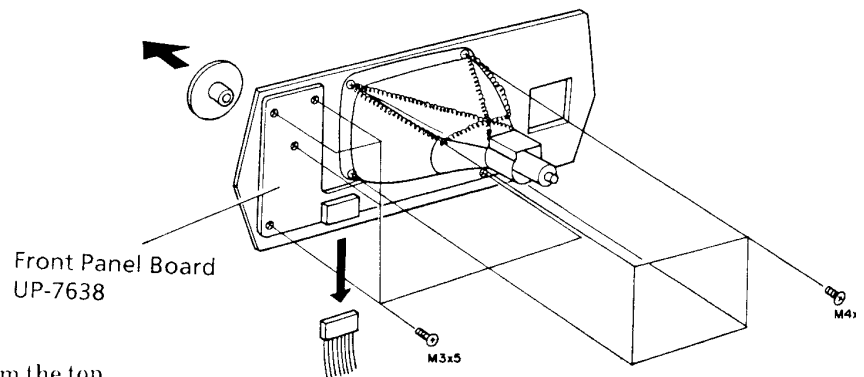


6-4-1 CRT

6. Remove the four M4 screws.

6-4-2 Front Panel Board UP-7638

6. Disconnect the connector.
7. Confirm that the energy selector is set to the OFF position.
8. Loosen the set-screw in the energy selector dial inserting an allen wrench from the top.
9. Set the energy selector to the 10J position.
10. Loosen the other set-screw in the same manner.
11. Remove the dial.
12. Remove the five M3 screws.



When setting the dial;

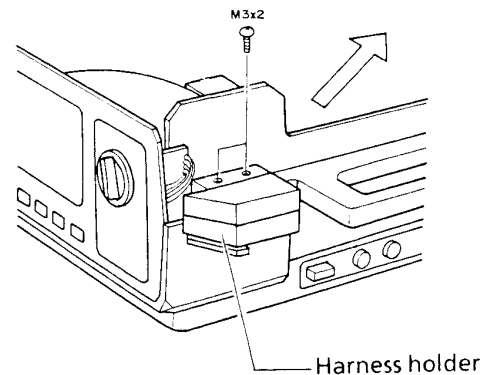
13. Rotate the shaft so that the flat cut plane of the shaft faces up.
14. Secure the set-screw so that the dial is set to the OFF position.
15. Set the energy selector to the 10J position and secure the other set-screw.

6-5 Paddle / Paddle Connector Receptacle

1. Remove the upper casing as shown in section 6-1.

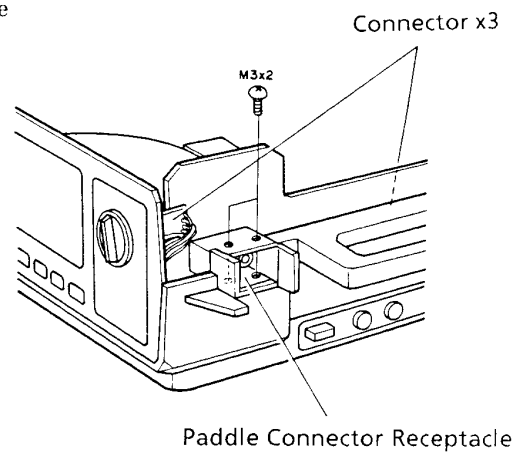
6-5-1 Paddle ND-701V (TEC-7100)

2. Remove the two M3 screws.
3. Disconnect the three connectors connected inside the instrument.
4. Remove the harness holder.



6-5-2 Paddle Connector Receptacle (TEC-7200/7300)

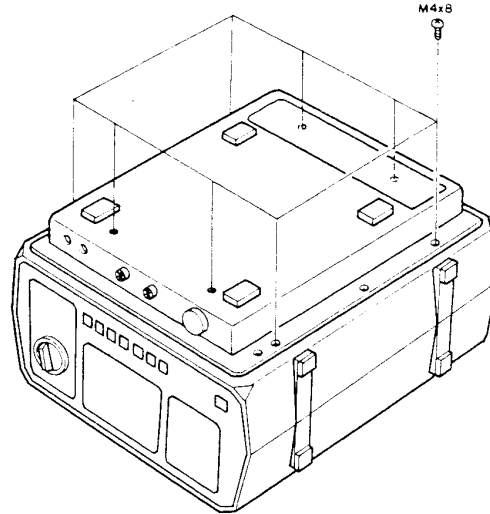
2. Disconnect the three connectors connected inside the instrument.
3. Remove the two M3 screws.



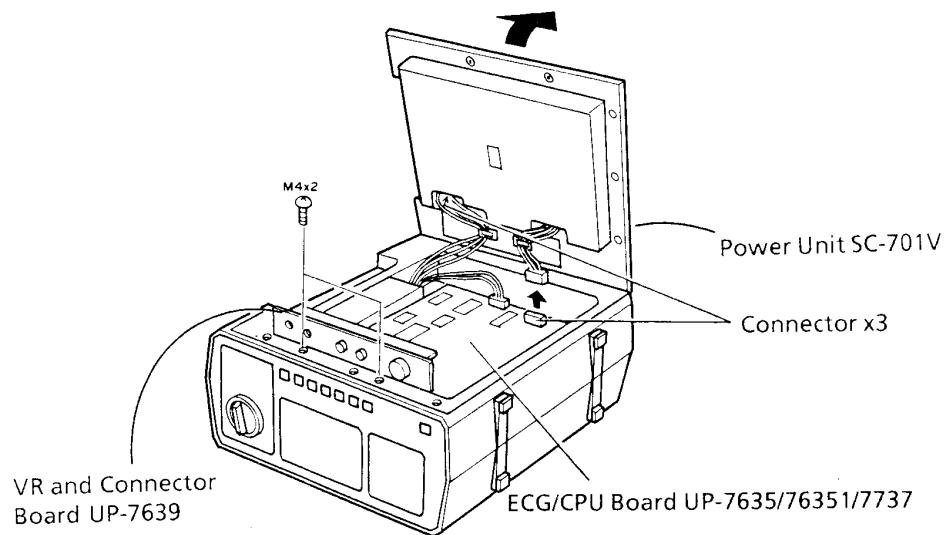
6. DISASSEMBLY

6-6 Lower Casing

1. Remove the eight M4 screws on the bottom of the main unit.

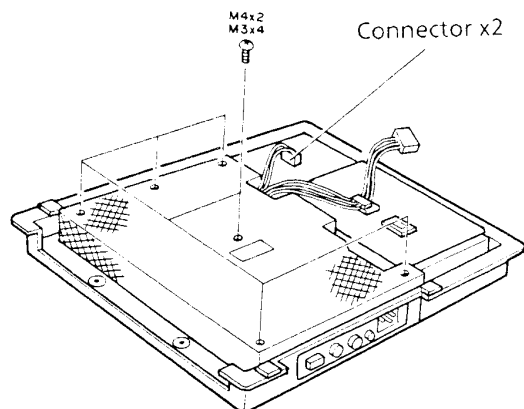


2. Open the lower casing from the front side.
3. Disconnect the three connectors.

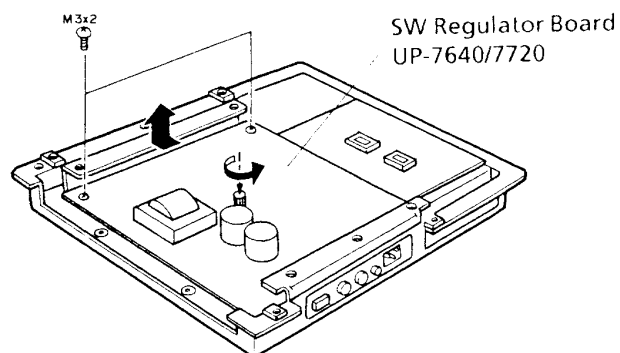


6-7 Power Unit SC-701V (SW Regulator Board UP-7640/7720)

1. Remove the upper casing as shown in section 6-6.
2. Disconnect the two connectors.
3. Remove the two M4 and four M3 screws.
4. Remove the shield case.

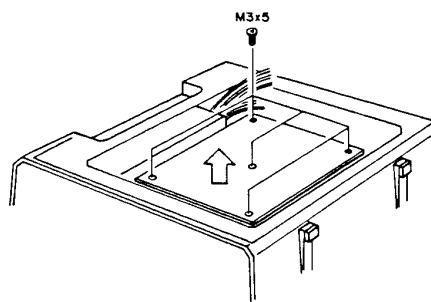


5. Remove the two M3 screws.
6. Remove the hexa-bolt.
7. Pressing the the board towards the opposite side of the AC inlet, lift up the board.



6-8 CPU Board UP-7635/76351/7737

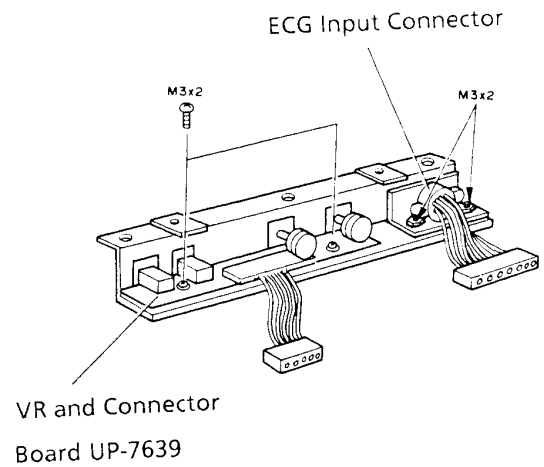
1. Remove the upper casing as shown in section 6-6.
2. Disconnect the eight connectors.
3. Remove the five M3 screws.



6. DISASSEMBLY

6-9 VR and Connector Board UP-7639 & ECG Input Connector

1. Remove the upper casing as shown in section 6-6.
2. Disconnect the two connectors.
3. Remove the two M4 screws.
4. Take out the assembly.
5. Remove the two M3 screws.



Section 7 MECHANICAL PARTS LIST

MAIN UNIT-1

INDEX NO.	NK PART NO.	DESCRIPTION	
101	1112-014719	Lower Casing (TEC-7100/7200/7300B, G)	下部ケース (TEC-7100/7200/7300B, G)
	1111-003261E	Lower Casing (Others)	下部ケース (Others)
102	1112-014728	Upper Casing (TEC-7100/7200/7300B, G)	上部ケース (TEC-7100/7200/7300B, G)
	1111-003288B	Upper Casing (Others)	上部ケース (Others)
104	1142-000829A	Front Panel Assembly (English) (TEC7100/7200A, C, J, K)	操作パネル ASSY (英語)
	1142-000847B	Front Panel Assembly (German) (TEC-7100/7200G)	操作パネル ASSY (独語)
	1142-000731	Front Panel Assembly (English) (TEC-7100/7200B)	操作パネル ASSY (英語) (TEC-7100/7200B)
	1142-000856A	Front Panel Assembly (Italian) (TEC-7100/7200R)	操作パネル ASSY (伊語)
	1142-000865A	Front Panel Assembly (Spanish) (TEC-7100/7200E)	操作パネル ASSY (西語)
	1142-000883	Front Panel Assembly (Finnish) (TEC-7100/7200H)	操作パネル ASSY (フィンランド語)
	1142-000704C	Front Panel Assembly (CSA) (TEC-7300A)	操作パネル ASSY (CSA)
	1142-000963	Front Panel Assembly (English) (TEC-7300J/K/C)	操作パネル ASSY (英語)
		Front Panel Assembly (German) (TEC-7300G)	操作パネル ASSY (独語)
		Front Panel Assembly (Spanish) (TEC-7300E)	操作パネル ASSY (西語)
105	1113-054308	High Voltage Cover (TEC-7100/7200/7300G)	高圧保護カバー
	1111-003314E	High Voltage Cover (Others)	高圧保護カバー (Others)
106	1114-173837	CRT HV Shield Case	CRT DC-DC シールドケース
107	1114-192941	Condenser Securing Belt	コンデンサー取付バンド
108	1114-174604A	HV Damper	HV クッションゴム
109	1113-046683B	Paddle Lock B	パドルロック B
110	1113-046647B	Paddle Lock Case	パドルロックケース
111	5903666	Spring KC-090-080-0230	スプリング KC-090-080-0230

7. MECHANICAL PARTS LIST

INDEX NO.	NK PART NO.	DESCRIPTION
112	1114-173695A	Paddle Lock パドルロック
113	1124-033827	ZR Blank Sheet ZR ブランクシート
114	1114-174212B	ZR Blank Panel (bottom) ZR ブランクドパネル
115	1124-033863	ZR Blank Sheet 2 ZR ブランクシート 2
116	1114-174596A	ZR Blank Panel 2 (bottom) ZR 用 ブランクドパネル 2
117	6402607	Bind Screw M4×8 バインド小ネジ M4×8
118	1114-173801A	Test Load Electrode テストロード電極
119	1114-174613	Relay Damper リレー用クッションゴム
121	6492937	Spacer M4 L = 10mm 間隔支柱 M4
122	6491983	Spacer Shaft UN18-2102-0040 L = 70 UN18-2102-0040 L = 70
123	1113-046674C	CRT Shield Case CRT シールドケース
124	1114-176576	Shield Tube Sponge シールドチューブスポンジ
125	1114-176487	CRT Insulation Plate CRT 絶縁板
126	1114-122964	CRT Ground Spring CRT 用アースバネ
127	1114-179706	CRT Support ブラウン管支柱 L=18
128	1143-004565B	Energy Select Knob エネルギースelectionツマミ
129	1113-046968B	CPU Shield Plate CPU 絶縁板
130	1113-046932A	Socket Housing (TEC-7200/7300) ソケットハウジング
131	1113-047067A	Harness Holder - 1 (TEC-7100) ハーネスホルダー-1
132	1113-047076	Harness Holder - 2 (TEC-7100) ハーネスホルダー-2
133	1113-046736A	Socket Insulator ソケットインスレータ
134	1114-173748A	Rubber Foot (side) ゴム足 (横)
135	1114-174221	ZR Ground Mounting ZR 用アース金具
136	1114-177735A	Dip Switch Cover ディップスイッチキャップ
A	UP-7740	CRT Driver
B	UP-7638	Front Panel Board
C	UP-7596/7596G	Test Detect Board
D	UP-7636/7851	High Voltage Board
E	UP-7682	DIP Switch Board
F	UP-7635/76351/7737	ECG / CPU Board

Recorder-1

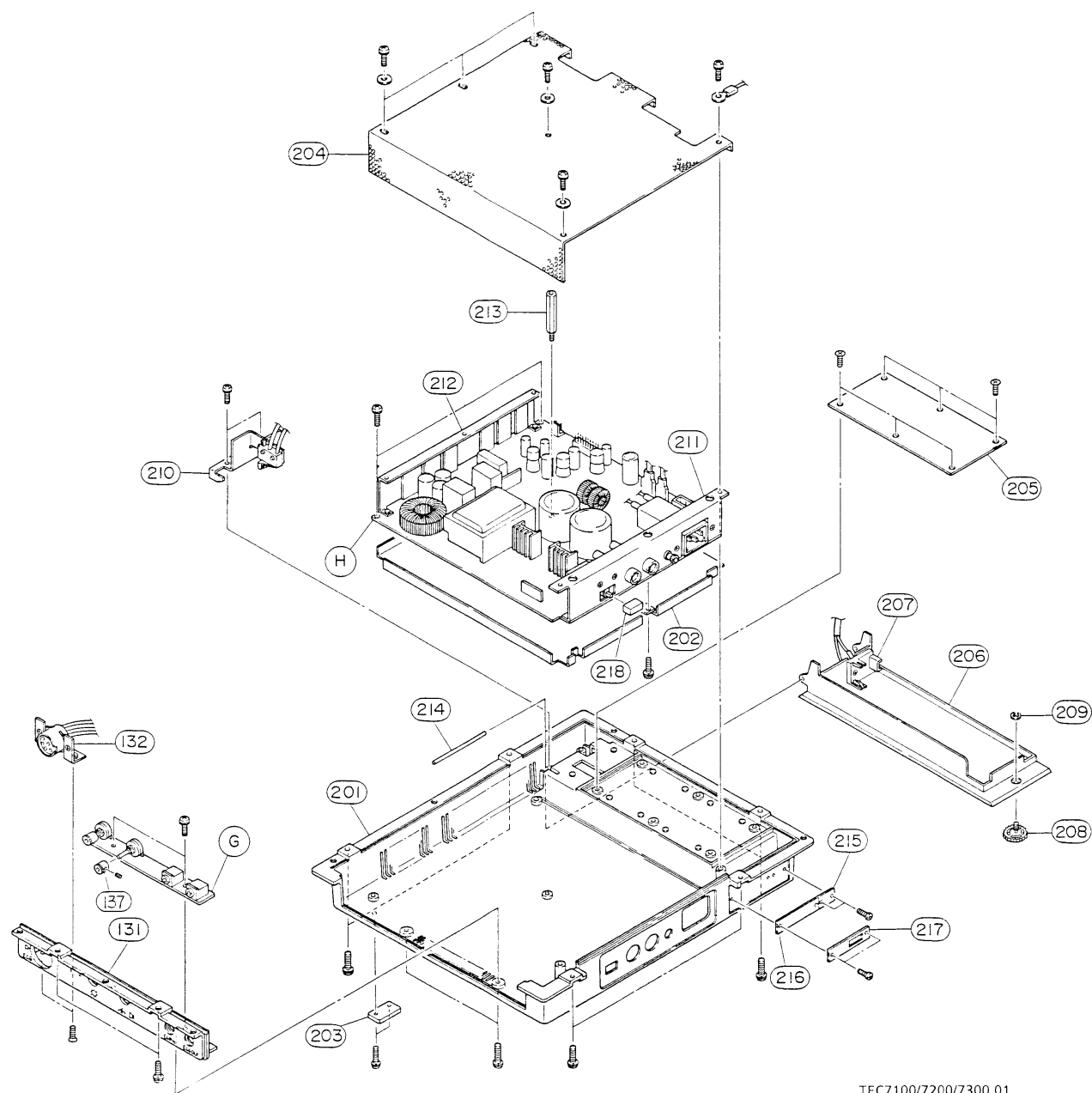
INDEX NO.	NK PART NO.	DESCRIPTION
309	1114-173392	Lever レバー
334	1114-173463A	Tension Spring テンションバネ
335	1113-046629A	Paper 紙入れケース
336	1114-173543	Felt フェルト

7. MECHANICAL PARTS LIST

Power Unit

INDEX NO.	NK PART NO.	DESCRIPTION
131	1122-005122B	Front Connector Panel (2) (English) 前面コネクタパネル (英語)
	1122-005158C	Front Connector Panel (2) (German) 前面コネクタパネル (独語)
	1122-005381A	Front Connector Panel (2) (Spanish) 前面コネクタパネル (西語)
132	1114-173784A	ECG Connector Holder ECGホルダー
137	1114-173712	VR Knob VRツマミ
G	UP-7639	VR and Connector Board

INDEX NO.	NK PART NO.	DESCRIPTION
201	111-003252A	Power Casing 電源ケース
202	1113-047682A	Shield Cover, Bottom, Power Unit シールド板 (下)
203	1114-173739A	Rubber Foot (bottom) ゴム足 (底)
204	1113-046665B	Shield Cover, Top, Power Unit シールドカバー
205	1114-174622	Insulation Plate 断熱板
206	1112-014336A	Battery Case バッテリーケース
207	2113-013175	Battery Terminal Mounting バッテリー端子台
208	1144-012581	Battery Case Lock Knob バッテリーロックツマミ
209	5900152	Retainer Ring リテーナリング
210	1114-173855	Micro Switch Holder マイクロ SW 取付金具
211	1113-046816A	Power Unit Chassis 電源下パネル
212	1114-175078	Heat Sink 放熱板
213	6491894	Spacer UN18-2102-0030 L = 38 UN18-2102-0030 L=38
214	1114-173677	Shaft シャフト
215	1124-000836A	AC Power Plate (117V / 60Hz) 本体 AC 銘板 (117V/60Hz)
	1124-000845	AC Power Plate (220V / 50Hz) 本体 AC 銘板 (220V/50Hz)
	1124-000854	AC Power Plate (240V / 50Hz) 本体 AC 銘板 (240V/50Hz)
215 ~ 217	1104-005397	AC Power Plate (TEC-7100 / 7200G) 本体 AC 銘板 (TEC-7100/7200G)
216	1194-005307	Plate (2) 本体銘板 (2)
217	1114-144155	Plate (5) 本体銘板 (5)
218	5690306	Knob BS15-01 (ivory) ツマミ BS15-01 (アイボリー)
H	SC-701V	Power Unit パワーユニット

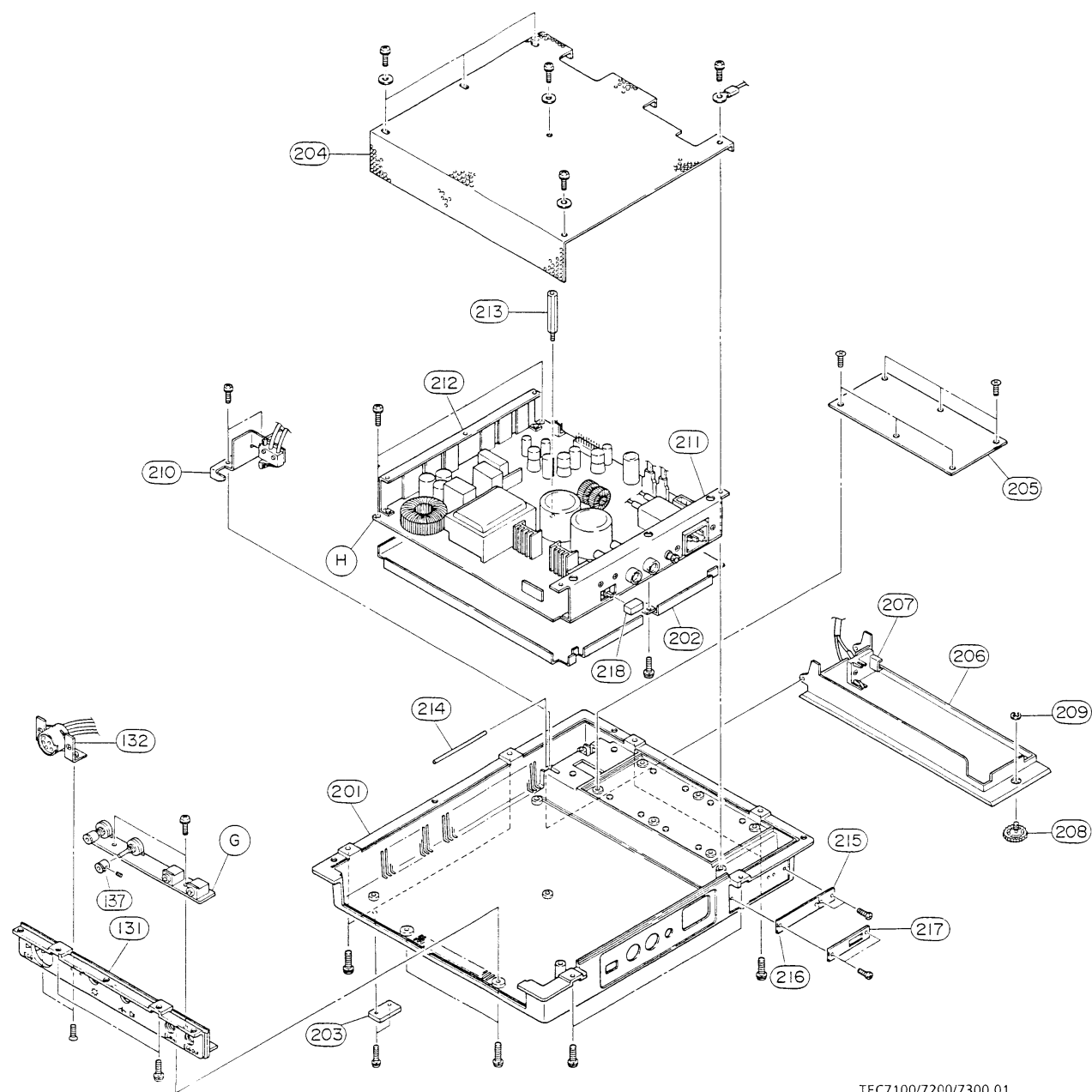


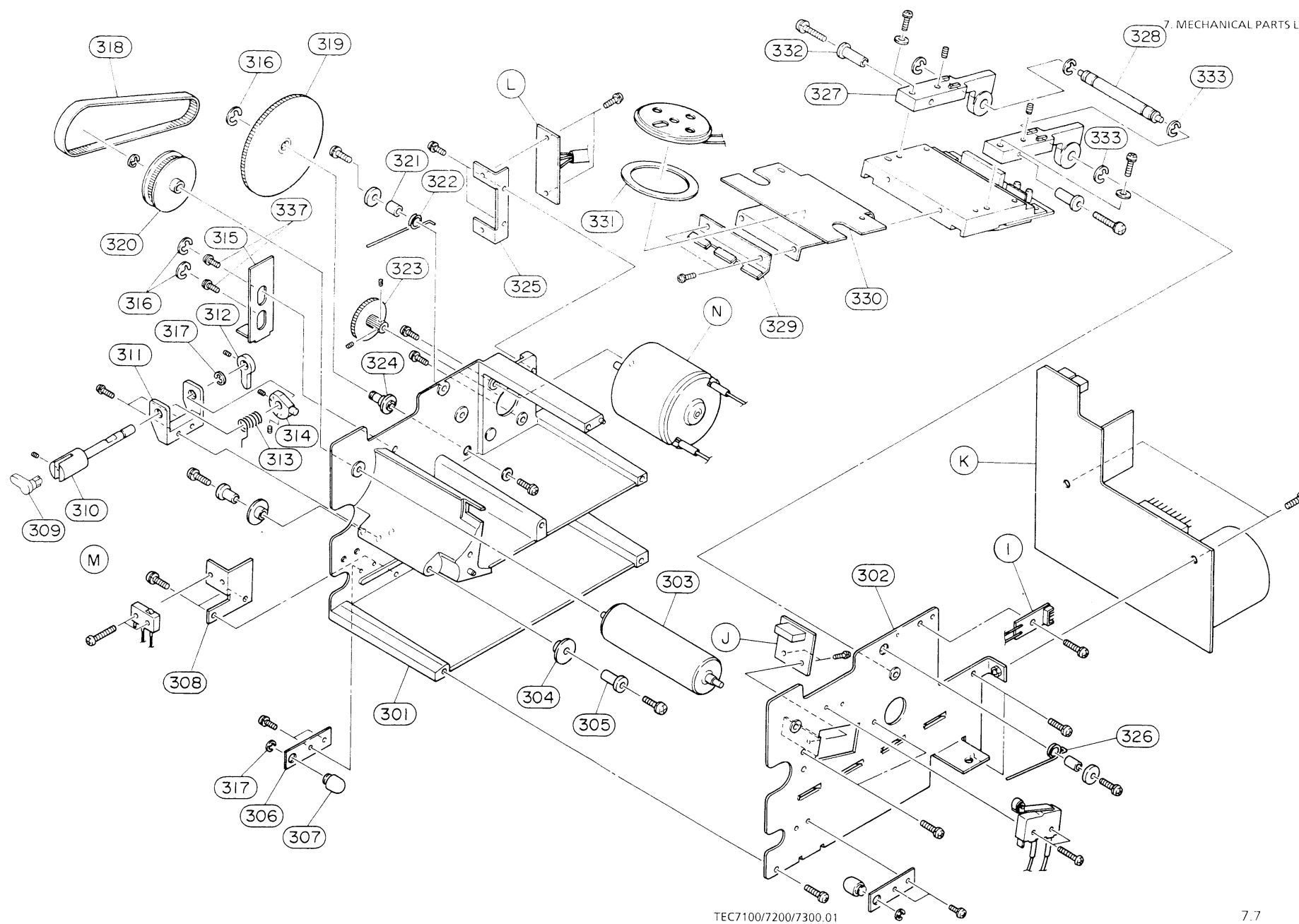
7. MECHANICAL PARTS LIST

Recorder - 2

INDEX NO.	NK PART NO.	DESCRIPTION
301	1144-012563A	Main Base Assembly (TEC-7100/7200) 基台 ASSY
	1144-014196	Main Base Assembly (TEC-7300) 基台 ASSY
302	1144-013036	Base Assembly 基板 ASSY
303	1114-173454C	Platen プラテン板
304	1114-173374A	Guide Flange ガイドフランジ
305	1114-194137	Flange フランジ軸
306	1114-173445A	Paper Guide Spring Plate 紙案内バネ
307	1114-173481	Click クリック
308	1114-194128	Microswitch Mounting Plate マイクロスイッチ取付板
310	1114-173516A	Lever Shaft レバー軸
311	1114-173588A	Lever Bearing レバー軸受け
312	1114-173418B	Paper Detection Collar 検出カラー
313	1114-173507A	Spring 回転バネ
314	1144-012572B	Boss Assembly 回転ボス ASSY
315	1114-173614A	Slide Plate スライド板
316	5900179	Retainer Ring E-40 (SUS) リテナリング E-40 (SUS)
317	5900161	Retainer Ring E-32 (SUS) リテナリング E-32 (SUS)
318	5903577	Timing Belt タイミングベルト MM-90-3.2
319	1114-170555	Pully Gear 18-108 プーリ歯車 18-108
320	1114-178298	Timing Pully 40 タイミングプーリ 40
321	6492429	Spacer $\Phi 4 \times 4$ スパース $\Phi 4 \times 4$
322	1114-173436	Head Spring 1.0 diameter (left) ヘッドバネ $\Phi 1.0$ (左)
323	1144-012545	Motor Gear Assembly (TEC-7100/7200) モータ歯車 ASSY
323+L	4740986	Rotary Encoder (TEC-7300) ロータリエンコーダ200P/R
324	1114-173534B	Gear Shaft 中継軸
325	1114-173605	Sensor Mounting Plate (TEC-7100/7200) 検出センサ取付板
	1114-194574	Sensor Mounting Plate (TEC-7300) 磁気センサ取付板
326	1114-173427	Head Spring 1.0 diameter (right) ヘッドバネ $\Phi 1.0$ (右)
327	1114-170029A	Head Holder ヘッド取付金具
328	1114-173472	Head Main Shaft ヘッド主軸

INDEX NO.	NK PART NO.	DESCRIPTION
329	1114-176585	Guide Spring ガイドバネ
330	1114-176496B	Speaker Plate スピーカー取付板
331	1114-173766A	Speaker Sponge スピーカースポンジ
332	1114-194119	Head Collar ヘッドおびカラー
333	5900188	Retainer Ring E-50 (SUS) リテナリング E-50 (SUS)
334	1114-173463A	Tension Spring テンションバネ
337	1114-173525	Guide Shaft ガイド軸 A
I	UP-7713	Speaker Connection Board
J	UP-7702	Feed Sensor Board
K	UP-7738	Motor Control Board
L	4790673	Magnetic Sensor FP-2R-02 (TEC-7100/7200)
M	UP-7644	Paper Sensor Board
N	4810447	Motor EN35-H107N1B





Section 8 Electrical Parts List

	PAGE
TEC-7100#	
TEC-7000X	CHASSIS PARTS-1 ----- 8.4
YZ-00#G#	CHASSIS PARTS-2 ----- 8.35
UP-7639#	VR AND CONNECTOR BD ----- 8.33
UP-7639	VR AND CONNECTOR BD ----- 8.11
UP-7682	DIP SW BD ----- 8.14
US-7635#	ECG/CPU BD (with ROM)
UP-76351	ECG/CPU BD (without ROM) ----- 8.29
UP-7851 (TEC-7100G) UP-7636 (Others)	HIGH VOLTAGE BD ----- 8.27 8.9
UP-7850 (TEC-7100G)	RELAY BD ----- 8.27
UP-7596G (TEC-7100G) UP-7596 (Others)	TEST DETECT BD ----- 8.5 8.4
UP-7740	CRT DRIVER ----- 8.25
UP-7638	FRONT PANEL BD ----- 8.11
WS-701V#	RECORDER UNIT
WS-701X	RECORDER CHASSIS PARTS ----- 8.34
UP-7738	MOTOR CONTROL BD ----- 8.24
SC-701V#	POWER UNIT
SC-701V#	POWER UNIT CHASSIS PARTS-1 ----- 8.12
SC-703X (TEC-7100B/G) SC-704X (Others)	POWER UNIT CHASSIS PARTS-2 ----- 8.3 8.4
UP-7720 (TEC-7100B) UP-7720G (TEC-7100G) UP-7640 (Others)	SW REGULATOR ----- 8.14 8.17 8.12
ND-701V#	EXTERNAL PADDLE
ND-705X (TEC-7100G) ND-701X (Others)	EXTERNAL PADDLE ----- 8.1

Units with # mark differ according to the model.
See page 1.10 for units with # mark.

		PAGE
TEC-7200#	TEC-7000X	CHASSIS PARTS-1 ----- 8.4
	YZ-00#G#	CHASSIS PARTS-2 ----- 8.35
	UP-7639#	VR AND CONNECTOR BD ----- 8.33
	UP-7639	VR AND CONNECTOR BD ----- 8.11
	UP-7682	DIP SW BD ----- 8.14
	US-7635#	ECG/CPU BD (with ROM)
	UP-7635	ECG/CPU BD (without ROM) ----- 8.5
	UP-7851 (TEC-7200G) UP-7636 (Others)	HIGH VOLTAGE BD ----- 8.27 8.9
	UP-7850 (TEC-7200G)	RELAY BD ----- 8.27
	UP-7596G (TEC-7200G) UP-7596 (Others)	TEST DETECT BD ----- 8.5 8.4
	UP-7740	CRT DRIVER ----- 8.25
	UP-7638	FRONT PANEL BD ----- 8.11
	WS-701V#	RECORDER UNIT
	WS-701X	RECORDER CHASSIS PARTS ----- 8.34
	UP-7738	MOTOR CONTROL BD ----- 8.24
	SC-701V#	POWER UNIT
	SC-701V#	POWER UNIT CHASSIS PARTS-1 ----- 8.2
	SC-703X (TEC-7200B/G) SC-704X (Others)	POWER UNIT CHASSIS PARTS-2 ----- 8.3 8.4
	UP-7720 (TEC-7200B) UP-7720G (TEC-7200G) UP-7640 (Others)	SW REGULATOR ----- 8.14 8.17 8.12
	ND-702V#	EXTERNAL PADDLE
	ND-706X (TEC-7200G) ND-702X (Others)	EXTERNAL PADDLE ----- 8.2 8.1

Units with # mark differ according to the model.
See page 1.11 for units with # mark.

		PAGE
TEC-7300#	TEC-7000X	CHASSIS PARTS-1 ----- 8.4
	YZ-00#G#	CHASSIS PARTS-2 ----- 8.35
	UP-7639#	VR AND CONNECTOR BD ----- 8.33
	UP-7639	VR AND CONNECTOR BD ----- 8.11
	UP-7682	DIP SW BD ----- 8.14
	US-7737#	ECG/CPU BD (with ROM)
	UP-7737	ECG/CPU BD (without ROM) ----- 8.19
	UP-7851 (TEC-7300G) UP-7636 (Others)	HIGH VOLTAGE BD ----- 8.27 8.9
	UP-7850 (TEC-7300G)	RELAY BD ----- 8.27
	UP-7596G (TEC-7300G) UP-7596 (Others)	TEST DETECT BD ----- 8.5 8.4
	UP-7740	CRT DRIVER ----- 8.25
	UP-7638	FRONT PANEL BD ----- 8.11
	WS-702V#	RECORDER UNIT
	WS-702X	RECORDER CHASSIS PARTS ----- 8.34
	UP-7738	MOTOR CONTROL BD ----- 8.24
	SC-701V#	POWER UNIT
	SC-701V#	POWER UNIT CHASSIS PARTS-1 ----- 8.12
	SC-703X (TEC-7300B/G) SC-704X (Others)	POWER UNIT CHASSIS PARTS-2 ----- 8.3 8.4
	UP-7720 (TEC-7300B) UP-7720G (TEC-7300G) UP-7640 (Others)	SW REGULATOR ----- 8.14 8.17 8.12
	ND-702V#	EXTERNAL PADDLE
	ND-706X (TEC-7300G) ND-702X (Others)	EXTERNAL PADDLE ----- 8.2 8.1

Units with # mark differ according to the model.
See page 1.12 for units with # mark.

When ordering replacement parts, please specify :

Instrument Type (TEC-7100 / 7200/7300)
Code No.
Description

Note : Most resistors which can be locally procured are omitted.

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION	
UP-1234	IC101	1234567	1	OPIC	AB1234
└-- Assembly name	└-- Symbol used in circuit diagrams	└-- NIHON KOHDEN part number	└-- Q'ty used in this instrument	└-- * Abbreviation	└-- Part name

* See next page.

ABBREVIATIONS

CN CONNECTOR

ACN	Square
ACN1	Square, plug
ACN2	Square, receptacle
BCN	Card edge
CCN	Round
CCN1	Round, plug
CCN2	Round, receptacle
CN	Coaxial plug or other types
CORD	Accessory cord
NCN	Nylon connector and pins
PCN	For use on PC board, short plug, terminal board

C CAPACITOR

MFC	Metallized film
OFC	Oil
TAC	Tantalum
TCO2	Tantalum, tubular
TCO4	Tantalum, vertical
VC	Variable
C	Barium titanate, paper, etc.
CEC1	Ceramic, withstanding voltage; <100V
CEC2	Ceramic, withstanding voltage; ≥100V
CM	Module
ECB	Electrolytic, block
CEO2	Electrolytic, tubular
CEO4	Electrolytic, vertical
FLC	Plastic film, ±5%
FLCB	Plastic film, block
FLC1	Plastic film, vertical
FLC2	Plastic film, tubular
MCC	Mica

D DIODE

D	Diode, array, for small signal
DB	Block, power, bridge
DP	Power, silicon diode, etc.
LCD	Liquid crystal display
LED	Light emitting diode, LED array
LEDC	LED character
SCR	Silicon controlled rectifier (SCR, thyristor)
ZD1	Zenor, ≤5V
ZD2	Zenor, ≤10V
ZD3	Zenor, >10V

IC INTEGRATED CIRCUIT

ADIC	A/D or D/A converter
AIC	Analog (log. amp., comparator, switch, sample & hold etc.)
CPU	CPU, CPU peripheral devices (RAM, I/O port, etc.)
DIC	Digital (timer, NMOS, PMOS, register, etc.)
MIC	CMOS
OPIC	Operational amp. buffer amp., etc.
REG	Regulator
TIC	TTL

Q TRANSISTOR

TR	Uni-junction, etc.
TRA	Type 2SA; PNP, high speed
TRB	Type 2SA; PNP, low speed
TRC	Type 2SC; NPN, high speed
TRD	Type 2SD; NPN, low speed
TRP	Photo-electric device, photo-fiber, etc.
FET	FIELD EFFECT TRANSISTOR
FET	Type 3SK/3SJ (dual gate, N-ch/P-ch)
FETJ	Type 2SJ (mono gate, P-ch)
FETK	Type 2SK (mono gate, N-ch)

SW SWITCH

ATT	Attenuator
DSW	Digital
PSW1	Push button, 1 button type
PSW9	Push button, 9 button type
PSW0	Push button, 10 button type
RSW	Rotary
SW	Micro, DIP, Toggle (tumbler), disc, etc.

T TRANSFORMER

CH	Choke coil
FBTF	Flyback
L	Inductance (coil)
MATF	Matching (IPTF, OPTF, IFTF)
PLTF	Pulse, oscillation TF
PT	Power (except for switching purpose)
T	High voltage, differential, HV unit, power supply, etc.
YOKE	Deflecting yoke

MOTOR

ACMO	AC (including gear head)
DCMO	DC (including gear head)
FAMO	Fan
FUMO	Pulse step (with gear head)

TUBE

CRT	Cathode ray tube
GA	Gas arrestor
NE	Neon tube, neon discharge tube
TUBE	Vacuum tube

R RESISTOR

RM	R module (including R and C)
----	------------------------------

RV VARIABLE RESISTOR

POT	Potentiometer
TFOT	Potentiometer on PCB, > 15mm in dia.
TVR1	Carbon on PCB
TVR2	Carbon on PCB
TWVR	Wirewound on PCB
VR	On panel
VR1	On panel, ≤ 30mm in dia.
VR2	On panel, > 30mm in dia.
WVR	Wirewound, large current

MISCELLANEOUS

GAGE	Gauge
METR	Meter, digital meter, manometer, electromagnetic counter, etc.
PRB	Pick up, microphone, ultrasonic probe, etc.
SP	Speaker, headphone, earphone, buzzer, etc.
TD	Transducer, galvanometer coil, pressure meter, differential pressure meter
THP	Thermal/temperature sensor/probe, thermometer, etc.
SOCK	Socket, cap
FH	Fuse holder
FUSE	Fuse
TERM	Terminal, lug board, etc.
BUS	Bus bar
LAMP	Lamp, bracket
BATT	Battery, battery holder, recharger, etc.
UNIT	Display/recorder/printer/disc-drive unit, etc.
MD	Module, unit, hybrid IC, etc.
TH	Line filter, thermistor, varistor, CdS, etc.
RY	Relay, reed relay, solenoid relay
ANT	Antenna
XTAL	Crystal
HEAD	Thermal head/array, discharge head/array
VALV	Valve, electromagnetic valve

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

ND-701X	EXTERNAL PADDLE
---------	-----------------

ND-701X		3352088	1	SW	SKHCAD (KHC10904)
ND-701X		5422276	1	PCN	HKP-14MS-7BT
ND-701X		5428047	2	PCN	170823-6
ND-701X		5428199	1	PCN	HKP-14FS02-7BT (10)
ND-701X	CNP551-CNP552	5428056	2	PCN	61874-1
ND-701X	D050	1102237	1	LED	HLMP-2855 (GREEN)
ND-701X	SW051-SW052	3202508	2	PSW1	8P-2021

ND-702X	EXTERNAL PADDLE
---------	-----------------

ND-702X		5415792	2	NCN	201330-1 Pin
ND-702X		5422276	1	PCN	HKP-14MS-7BT
ND-702X		5428207	1	PCN	350036-2 with HKP-14FS (4)
ND-702X	D050	1102237	1	LED	HLMP-2855 (GREEN)
ND-702X	D051	1100943	1	LED	HLMP2500 green
ND-702X	D052	1100934	1	LED	HLMP2400 Yellow
ND-702X	D053	1100925	1	LED	HLMP2300 Red
ND-702X	SW050	3352088	1	SW	SKHCAD (KHC10904)
ND-702X	SW051-SW052	3202508	2	PSW1	8P-2021

ND-705X	EXTERNAL PADDLE
---------	-----------------

ND-705X		3352088	1	SW	SKHCAD (KHC10904)
ND-705X		5422276	1	PCN	HKP-14MS-7BT
ND-705X		5428047	2	PCN	170823-6
ND-705X		5428199	1	PCN	HKP-14FS02-7BT (10)
ND-705X	CNP551-CNP552	5428056	2	PCN	61874-1
ND-705X	D050	1102237	1	LED	HLMP-2855 (GREEN)
ND-705X	SW051-SW052	3202508	2	PSW1	8P-2021

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
ND-706X EXTERNAL PADDLE				
ND-706X		5415792	2	NCN 201330-1 Pin
ND-706X		5422276	1	PCN HKP-14MS-7BT
ND-706X		5428207	1	PCN 350036-2 with HKP-14FS (4)
ND-706X	D050	1102237	1	LED HLMP-2855 (GREEN)
ND-706X	D051	1100943	1	LED HLMP2500 green
ND-706X	D052	1100934	1	LED HLMP2400 Yellow
ND-706X	D053	1100925	1	LED HLMP2300 Red
ND-706X	SW050	3352088	1	SW SKHCAD (KHC10904)
ND-706X	SW051-SW052	3202508	2	PSW1 8P-2021

SC-701VA POWER UNIT CHASSIS PARTS-1				
SC-701VA		5620062	2	FUSE SAU-4A
SC-701VA		5625404	2	FH FEK 031.1661 Cap

SC-701VE POWER UNIT CHASSIS PARTS-1				
SC-701VE		5621079	2	FUSE 179 120-2A
SC-701VE		5625413	2	FH FEK 031.1663 Cap

SC-701VG POWER UNIT CHASSIS PARTS-1				
SC-701VG		5621079	2	FUSE 179 120-2A
SC-701VG		5625413	2	FH FEK 031.1663 Cap

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

SC-701VH POWER UNIT CHASSIS PARTS-1

SC-701VH	5621079	2	FUSE 179 120-2A
SC-701VH	5625413	2	FH FEK 031.1663 Cap

SC-701VJ POWER UNIT CHASSIS PARTS-1

SC-701VJ	5620062	2	FUSE SAU-4A
SC-701VJ	5625404	2	FH FEK 031.1661 Cap

SC-701VK POWER UNIT CHASSIS PARTS-1

SC-701VK	5621079	2	FUSE 179 120-2A
SC-701VK	5625413	2	FH FEK 031.1663 Cap

SC-701VR POWER UNIT CHASSIS PARTS-1

SC-701VR	5621079	2	FUSE 179 120-2A
SC-701VR	5625413	2	FH FEK 031.1663 Cap

SC-703X POWER UNIT CHASSIS PARTS-2

SC-703X	3280111	1	SW SS-5GL2
SC-703X	5500922	1	CORD 170187-2 (300) Red
SC-703X	5500931	1	CORD 170187-2 (300) Black
SC-703X	5500949	1	CORD 171822-2 2P with Cord

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

SC-704X POWER UNIT CHASSIS PARTS-2

SC-704X		3280111	1	SW SS-5GL2
SC-704X		5500922	1	CORD 170187-2 (300) Red
SC-704X		5500931	1	CORD 170187-2 (300) Black
SC-704X		5500949	1	CORD 171822-2 2P with Cord

TEC7000X CHASSIS PARTS-1

TEC7000X		3790149	1	T D/D Converter SWH-5042Y
TEC7000X	CNP105	5427583	1	PCN M62-1503038SA-1 (20)
TEC7000X	CNP106	5500869	1	CORD HIF3A5B-40D-AC(10)
TEC7000X	CNP355	5500806	1	CORD Paddle ECG Connection Cable
TEC7000X	CNP607	5427467	1	PCN M62-12-3039SA (10)
TEC7000X	CNP610	5421018	1	ACN1 A3-705B-00J 3P PLUG FEMALE
TEC7000X	CNP751	5500887	1	CORD HIF3A-34D-AC(5)
TEC7000X		2000586	1	CRT CRT140CYB31
TEC7000X	CNP600	3793226	1	YOKE YS-33276E with Cord
TEC7000X	CNP620	5500789	1	CORD CRT CORD 9P with Connector
TEC7000X		3400286	1	RY HV Relay NKR-203 12V/30HM
TEC7000X		3751138	1	CH NKL-201 28uH TTR
TEC7000X	CNP535	5500833	1	CORD HV Cable 41898(250) Red
TEC7000X	CNP545	5500842	1	CORD HV Cable 41898(180) White
TEC7000X	CNP565	5500815	1	CORD HV Cable 41898(150) Red

UP-7596 TEST DETECT BD

UP-7596	CNP555	5500798	1	CORD CORD for TEST LOAD
UP-7596	PC580	0600263	1	TRP PC-827 PHOTOCOUPLER DUAL

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7596G TEST DETECT BD				
UP-7596G	CNP555	5500798	1	CORD CODE for TEST LOAD
UP-7596G	PC580	0600263	1	TRP PC-827 PHOTOCOUPLER DUAL
UP-7635 ECG/CPU BD				
UP-7635	CNJ100	5427663	1	PCN M60-12-30-114P STRAIGHT
UP-7635	CNJ101	5445474	1	PCN IL-2P-S3FP2-1
UP-7635	CNJ105	5427672	1	PCN M60-15-30-114P STRAIGHT
UP-7635	CNJ106	5427173	1	PCN HIF3F-40PADSA 40P
UP-7635	CNJ108	5425139	1	PCN HKP-22MS-11BT
UP-7635	CNJ110	5427663	1	PCN M60-12-30-114P STRAIGHT
UP-7635	CNJ157	5427743	1	PCN HIF3F-34PA-2.54DSA
UP-7635	CNJ303	5427672	1	PCN M60-15-30-114P STRAIGHT
UP-7635	CNJ355	5427636	1	PCN M60-03-30-114P STRAIGHT
UP-7635	C100	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-7635	C103-C109	4317525	7	CEC1 TP D55Y5V1H 104Z 5-W
UP-7635	C111	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-7635	C112	3820768	1	FLC1 454M6302 104K
UP-7635	C113	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-7635	C120	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7635	C121	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-7635	C122	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-7635	C123	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7635	C124	4315082	1	FLC1 ECQ-B 1H 222JZ3 0.0022uF
UP-7635	C125-C126	3839793	2	FLC1 ECQ-V1H224JZ 0.22uF
UP-7635	C127	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7635	C128	4315206	1	FLC1 ECQ-B 1H 223JZ3 0.022uF
UP-7635	C129	4317623	1	CEC2 DD05-989B 331K500 (330pF)
UP-7635	C130	4317614	1	CEC2 DD05-989B 221K500 (220pF)
UP-7635	C151	4317552	1	CEC2 DD05-989SL 220K500 (22pF)
UP-7635	C152	3890353	1	ECR-GA035M11-35pF
UP-7635	C153	3839837	1	FLC1 ECQ-V1H474JZ 0.47uF
UP-7635	C201-C206	4315304	6	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-7635	C207-C210	4315162	4	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-7635	C211-C220	4315304	10	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-7635	C230	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7635	C231	3839525	1	FLC1 ECQ-B1H102JZ 0.001uF
UP-7635	C232	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7635	C233	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-7635	C234	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-7635	C241-C242	4315046	2	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-7635	C243	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7635	C250-C251	3839873	2	FLC1 ECQ-V1H105JZ 1.0uF
UP-7635	C252	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-7635	C253	4317641	1	CEC2 DD06-999B 681K500 (680pF)
UP-7635	C254	3824461	1	MPC ECQ-V1H 154JZ 50V 0.15uF
UP-7635	C255	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-7635	C256	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-7635	C257-C270	4315304	14	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-7635	C271-C272	3800219	2	EC04 ECEA1CS470 16V47uF
UP-7635	C273	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-7635	C274	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7635	C275	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-7635	C301-C304	4315046	4	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-7635	C305	3839819	1	FLC1 ECQ-V1H334JZ 0.33uF
UP-7635	C306	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-7635	C307	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7635	C309-C310	3800371	2	EC04 ECEA1VS100 35V10uF
UP-7635	C311	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-7635	C312	4315287	1	FLC1 ECQ-V 1H 683JZ3 (0.068uF)
UP-7635	C351-C352	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-7635	C353	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-7635	C354	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-7635	C355-C356	3800371	2	EC04 ECEA1VS100 35V10uF
UP-7635	C381-C382	3839793	2	FLC1 ECQ-V1H224JZ 0.22uF
UP-7635	C383	3810832	1	TC04 204M3502 105M4 (1uF/35V)
UP-7635	C384	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-7635	C385	4315242	1	FLC1 ECQ-V 1H 333JZ3 (0.033uF)
UP-7635	C386-C387	4317525	2	CEC1 TP D55Y5V1H 104Z 5-W
UP-7635	C401	4317614	1	CEC2 DD05-989B 221K500 (220pF)
UP-7635	C402-C407	4317525	6	CEC1 TP D55Y5V1H 104Z 5-W
UP-7635	DA101	0950571	1	D MA430
UP-7635	DA102	0800582	1	D Diode Array DAN 401
UP-7635	DA103	0800573	1	D Diode Array DAP 401
UP-7635	DA104	0800582	1	D Diode Array DAN 401
UP-7635	DA105	0800573	1	D Diode Array DAP 401
UP-7635	DA231	0800573	1	D Doide Array DAP 401
UP-7635	DA232	0800582	1	D Diode Array DAN 401
UP-7635	DA233	0800573	1	D Diode Array DAP 401

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-7635	D100-D106	4322528	7	D	1S2076ARE
UP-7635	D151-D153	4322528	3	D	1S2076ARE
UP-7635	D201-D216	0800564	16	D	1SS237
UP-7635	D217-D218	4322528	2	D	1S2076ARE
UP-7635	D219	0800564	1	D	1SS237
UP-7635	D220-D225	4322528	6	D	1S2076ARE
UP-7635	D230-D231	4322528	2	D	1S2076ARE
UP-7635	D232	0800092	1	D	0A91(1S1005)
UP-7635	D241-D242	4322528	2	D	1S2076ARE
UP-7635	D253-D259	4322528	7	D	1S2076ARE
UP-7635	D301-D302	4322528	2	D	1S2076ARE
UP-7635	D303-D304	4327612	2	ZD2	HZ9C1RE (8.9-9.3V)
UP-7635	D305-D314	0800644	10	D	1SV126
UP-7635	D351-D354	4322528	4	D	1S2076ARE
UP-7635	D355-D356	4327612	2	ZD2	HZ9C1RE (8.9-9.3V)
UP-7635	D357-D358	4322528	2	D	1S2076ARE
UP-7635	D381-D382	4322528	2	D	1S2076ARE
UP-7635	D401	4322528	1	D	1S2076ARE
UP-7635	GA351	2100335	1	GA	B1C90 (90V)
UP-7635	ICS103	5422846	1	SOKT	IC SOCKET DL-2-28A (01)
UP-7635	ICS107	5601279	1	SOKT	208-93-764 64PIC SOCKET
UP-7635	ICS201	5601279	1	SOKT	208-93-764 64PIC SOCKET
UP-7635	ICS203	5422846	1	SOKT	IC SOCKET DL-2-28A (01)
UP-7635	ICS405	5601279	1	SOKT	208-93-764 64PIC SOCKET
UP-7635	IC101	1205786	1	CPU	uPD71055C(82C55A-2)
UP-7635	IC102	1302859	1	CPU	uPD8279C-2
UP-7635	IC104	1302984	1	MIC	uPD74HC138C(HD74HC138P)
UP-7635	IC105	1253403	1	AIC	TL7700C
UP-7635	IC106	1303528	1	MIC	uPD74HC123C(HD74HC123P)
UP-7635	IC107	1205768	1	CPU	HD63B03XP
UP-7635	IC108	1303074	1	MIC	uPD74HC4040C(HD74HC4040P)
UP-7635	IC109	1302948	1	MIC	uPD74HC08C(HD74HC08P)
UP-7635	IC110	1302975	1	MIC	HD74HC32P(uPD74HC32C)
UP-7635	IC112	1203752	1	TIC	SN74LS365
UP-7635	IC114	1252752	1	OPIC	HA17082PS 2FET
UP-7635	IC115	1302948	1	MIC	uPD74HC08C(HD74HC08P)
UP-7635	IC116	1302912	1	MIC	HD74HC00P(uPD74HC00C)
UP-7635	IC151	1303662	1	CPU	MSM6242 RS
UP-7635	IC201	1205768	1	CPU	HD63B03XP
UP-7635	IC202	1253501	1	ADIC	uPD-7004C8CH10BITA/D
UP-7635	IC204	1206473	1	CPU	MB84256-10LP-G
UP-7635	IC205	1303065	1	MIC	HD74HC245P(uPD74HC245C)
UP-7635	IC206-IC207	1303056	2	MIC	HD74HC244P(uPD74HC244C)

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-7635	IC208	1302912	1	MIC	HD74HC00P(uPD74HC00C)
UP-7635	IC209	1302939	1	MIC	HD74HC04P(uPD74HC04C)
UP-7635	IC230	1300629	1	MIC	HD14052BP(MC14052BCP)
UP-7635	IC250	1300629	1	MIC	HD14052BP(MC14052BCP)
UP-7635	IC251	1601875	1	MD	NP2014B
UP-7635	IC252	1300611	1	MIC	HD14051BP(MC14051BCP)
UP-7635	IC253	1300638	1	MIC	HD14053BP(MC14053BCP)
UP-7635	IC254-IC255	1253118	2	OPIC	uPC324C QUAD
UP-7635	IC256	1253715	1	OPIC	uPC812C(LF412CN)2FET
UP-7635	IC257	1300638	1	MIC	HD14053BP(MC14053BCP)
UP-7635	IC258	1252084	1	OPIC	TL072CP
UP-7635	IC301-IC302	1252084	2	OPIC	TL072CP
UP-7635	IC303-IC305	1300611	3	MIC	HD14051BP(MC14051BCP)
UP-7635	IC306	1253724	1	OPIC	uPC4570C
UP-7635	IC307	1251165	1	OPIC	uPC1458C
UP-7635	IC308	1251904	1	AIC	MB4204 (uPC339C)
UP-7635	IC309	1300629	1	MIC	HD14052BP(MC14052BCP)
UP-7635	IC351	1252084	1	OPIC	TL072CP
UP-7635	IC352	1300629	1	MIC	HD14052BP(MC14052BCP)
UP-7635	IC380	1300638	1	MIC	HD14053BP(MC14053BCP)
UP-7635	IC381	1252752	1	OPIC	HA17082PS 2FET
UP-7635	IC401-IC402	1303056	2	MIC	HD74HC244P(uPD74HC244C)
UP-7635	IC403	1303065	1	MIC	HD74HC245P(uPD74HC245C)
UP-7635	IC404	1204902	1	CPU	HM6264LP-15(uPD4364C-15L
UP-7635	IC406	1251174	1	ADIC	uPC624C (DAC-08CQ)
UP-7635	IC408	1300522	1	MIC	HD14042BP (MC14042BCP)
UP-7635	IC409	1303546	1	MIC	HD74HC151P (uPD74HC151C)
UP-7635	IC410	1303074	1	MIC	uPD74HC4040C(HD74HC4040P
UP-7635	IC411	1302921	1	MIC	uPD74HC02C(HD74HC02P)
UP-7635	IC412	1303412	1	MIC	SN74HC03N(uPD74HC03C)
UP-7635	PC301	0600254	1	TRP	PC837
UP-7635	PC302	1704345	1	TRP	PC817 PHOTOCOUPLER
UP-7635	Q230-Q231	4335069	2	TRC	2SC1213AKDTZ
UP-7635	Q240-Q241	4335069	2	TRC	2SC1213AKDTZ
UP-7635	Q250	4330038	1	TRA	2SA495GTM-Y,TPE2
UP-7635	Q251	4335069	1	TRC	2SC1213AKDTZ
UP-7635	RA100	4090582	1	RM	EXB-P84-103J
UP-7635	RA101	4090813	1	RM	EXB-P88-103J
UP-7635	RA102-RA103	4090582	2	RM	EXB-P84-103J
UP-7635	RA104	4090813	1	RM	EXB-P88-103J
UP-7635	RA105-RA106	4091153	2	RM	EXB-T44-101J
UP-7635	RA201-RA202	4092624	2	RM	EXB-T44-472J 4.7 KOHM
UP-7635	RA203	4090822	1	RM	EXB-P88-472J

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-7635	RA204	4090787	1	RM	EXB-P88-104J
UP-7635	RA206	4090813	1	RM	EXB-P88-103J
UP-7635	RA230	4091884	1	RM	EXB-P84-472J
UP-7635	RA301	4093338	1	RM	CMR-042B 20.0K OHM
UP-7635	RA302	4093347	1	RM	CMR-042A 30.1K OHM
UP-7635	RA303	4090689	1	RM	EXB-P84-473J
UP-7635	RA304	4093356	1	RM	EXB-F8V-154J
UP-7635	RA305-RA306	4091572	2	RM	EXB-T44-103J
UP-7635	RA401	4090813	1	RM	EXB-P88-103J
UP-7635	SW100	3352168	1	SW	DSS 104
UP-7635	SW102	3350838	1	DSW	DSS102
UP-7635	T301	3772285	1	PLTF	EP17 50KHZ SIG Yellow
UP-7635	T302	3772267	1	PLTF	EP17 50KHZ DC-DC red
UP-7635	T351	3772258	1	PLTF	EP13 50KHZ SIG Yellow
UP-7635	T352	3772276	1	PLTF	EP13 50KHZ DC-DC Red
UP-7635	T381	3772258	1	PLTF	EP13 50KHZ SIG Yellow
UP-7635	VR101	4160685	1	TPOT	GF06P 100KOHM
UP-7635	VR251	4160596	1	TPOT	GF06P 1KOHM
UP-7635	VR252	4160667	1	TPOT	GF06P 20KOHM
UP-7635	VR253	4160827	1	TPOT	GF06P 500KOHM
UP-7635	VR254	4160667	1	TPOT	GF06P 20KOHM
UP-7635	VR255	4160604	1	TPOT	GF06P 5KOHM
UP-7635	VR381	4160827	1	TPOT	GF06P 500KOHM
UP-7635	X100	1750927	1	XTAL	TD308C(XCO-B)8MHZ
UP-7635	X151	1702597	1	XTAL	KF38G 32.768KHZ
UP-7635	ZD250	1253519	1	REG	LT1009CZ 2.5VREF
UP-7635	ZD251	1090329	1	ZD2	HZ6C1 6V

UP-7636 HIGH VOLTAGE BD

UP-7636		5491361	1	CHEM	HEAT SINK SHEET T0-3P2 TC30AG(F-1)
UP-7636	CNJ501	5427672	1	PCN	M60-15-30-114P STRAIGHT
UP-7636	CNJ511	5414864	1	NCN	350543-1 4P
UP-7636	CNJ515	5424024	1	NCN	171825-2 Receptacle Male
UP-7636	CNJ525	5424033	1	NCN	171825-3 Receptacle Male
UP-7636	CNJ535	5427734	1	PCN	170267-1
UP-7636	CNJ545	5427734	1	PCN	170267-1
UP-7636	CNJ555	5427681	1	PCN	M60-03-30-134
UP-7636	C500	3851146	1	CEC2	DD05B471K500 500V470pF
UP-7636	C501	3800469	1	EC04	ECEA1HS010 50V1uF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7636	C502	3839605	1	FLC1 ECQ-B1H472JZ 0.0047uF
UP-7636	C503	3801245	1	EC04 ECEA1VU 102
UP-7636	C504	3800193	1	EC04 ECEA1CS100 16V10uF
UP-7636	C505	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7636	C506	3800237	1	EC04 ECEA1CS221 16V220uF
UP-7636	C507	3801414	1	EC04 ECES1EU682G 25V6800uF
UP-7636	C509	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7636	C510	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7636	C514	3859147	1	CEC2 10MDQ222M
UP-7636	C515	3839605	1	FLC1 ECQ-B1H472JZ 0.0047uF
UP-7636	C516	3839819	1	FLC1 ECQ-V1H334JZ 0.33uF
UP-7636	C517-C520	3839757	4	FLC1 ECQ-V1H104JZ 0.1uF
UP-7636	C721	3839641	1	FLC1 ECQ-B1H103JZ 0.01uF
UP-7636	C722-C723	3810502	2	TC04 ECSZ35HS6R8(242M3502-685M
UP-7636	C724	3839703	1	FLC1 ECQ-V1H333JZ 0.033uF
UP-7636	C725	3839525	1	FLC1 ECQ-B1H102JZ 0.001uF
UP-7636	D500-D502	4322528	3	D 1S2076ARE
UP-7636	D503-D504	0910008	2	DP SR1FM8 800mA 400V
UP-7636	D506-D509	4322528	4	D 1S2076ARE
UP-7636	D510-D513	1101006	4	DP RC2 2007A 2KV
UP-7636	D515	0910008	1	DP SR1FM8 800mA 400V
UP-7636	D517	0910008	1	DP SR1FM8 800mA 400V
UP-7636	D518-D522	4322528	5	D 1S2076ARE
UP-7636	D720-D721	4322528	2	D 1S2076ARE
UP-7636	IC501	1253047	1	REG TL494CN SW REG
UP-7636	IC502	1300112	1	MIC MC14001UBCP (CD4001UBE)
UP-7636	IC503	1300638	1	MIC HD14053BP(MC14053BCP)
UP-7636	IC504	1253109	1	OPIC uPC358C DUAL
UP-7636	IC505	1253706	1	REG HA17806P Regulator
UP-7636	IC506	1252449	1	REG MC7906CT
UP-7636	IC720	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-7636	L501-L502	3788009	2	L LF1-101K
UP-7636	Q500	0400568	1	TRD 2SD1271
UP-7636	Q501	0200499	1	TRB 2SB946
UP-7636	Q502	0400621	1	TRD 2SD1038
UP-7636	Q503	0400434	1	TRD 2SD571 L or M
UP-7636	Q504-Q506	0300596	3	TRC 2SC1345K-D(2SC1707H-C)
UP-7636	Q507	0200499	1	TRB 2SB946
UP-7636	RLY501	3430707	1	RY HV Relay NKR-102 8KV 80mA
UP-7636	T500	3790167	1	FBTF T-3790167 HV-DD
UP-7636	VR500	4160667	1	TPOT GF06P 20KOHM
UP-7636	VR501	4160658	1	TPOT GF06P 500 OHM
UP-7636	VR720	4160685	1	TPOT GF06P 100KOHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7636	VR721	4160613	1	TPOT GF06P 10KOHM

UP-7638 FRONT PANEL BD

UP-7638		5415551	2	NCN	Pin 170204-2
UP-7638		5424078	1	NCN	171822-2 PLUG FEMALE
UP-7638	CNJ750	5422276	1	PCN	HKP-14MS-7BT
UP-7638	CNJ751	5427957	1	PCN	HIF3F34PA-2.5DS
UP-7638	CNJ752	5427645	1	PCN	M60-06-30-114P STRAIGHT
UP-7638	CNJ753	5427752	1	PCN	FH3-10S-1.25DS
UP-7638	CNP752	5427609	1	PCN	M62-06-0004SA (30)
UP-7638	C750	3800415	1	EC04	ECEA1VS101 35V100uF
UP-7638	C751	3800219	1	EC04	ECEA1CS470 16V47uF
UP-7638	C752	3820768	1	FLC1	454M6302 104K
UP-7638	DA750	0950571	1	D	MA430
UP-7638	IC750	1203975	1	TR	TD62004P
UP-7638	IC751	1205759	1	TIC	SN74LS07
UP-7638	LED750	1102139	1	LED	TLY 253 Yellow
UP-7638	LED751	1102148	1	LED	TL0 253 Orange
UP-7638	LED752-LED753	1102121	2	LED	TLG 253 Green
UP-7638	LED754	1102139	1	LED	TLY 253 Yellow
UP-7638	LED755-LED756	1102121	2	LED	TLG 253 Green
UP-7638	RA751	4093196	1	RM	EXB-F8V 103J 10K
UP-7638	RA752	4093365	1	RM	EXB-F8V-391J
UP-7638	RA753	4090831	1	RM	EXB-T44-102J
UP-7638	RA754	4093374	1	RM	EXB-F8V-223J
UP-7638	SW750-SW751	3280272	2	SW	KHC-10903
UP-7638	SW752	3352524	1	DSW	SRRS 1-18
UP-7638	TR750-TR757	0200507	8	TRB	2SB561C

UP-7639 VR AND CONNECTOR BD

UP-7639	CNJ702-CNJ703	5430721	2	CN	LGY 6501-0101
UP-7639	CNP011	5427431	1	PCN	M62-12-0017SA (30)
UP-7639	VR701	4161523	1	TVR2	RV16YP15S 500K OHM
UP-7639	VR702	4161532	1	TVR2	RV16YP15S 100 OHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7640 SW REGULATOR				
UP-7640		5415836	2	NCN 5167PBT
UP-7640		5601314	4	SOKT F4034P FUSE HOLDER
UP-7640		5601323	2	SOKT RT807
UP-7640	CNJ801	5428065	1	PCN 5281-03A 3P
UP-7640	CNJ802-CNJ803	5427734	2	PCN 170267-1
UP-7640	CNJ804	5425139	1	PCN HKP-22MS-11BT
UP-7640	CNJ805	5414864	1	NCN 350543-1 4P
UP-7640	CNJ806-CNJ807	5427734	2	PCN 170267-1
UP-7640	CNJ808	5424024	1	NCN 171825-2 Receptacle Male
UP-7640	CNJ809	5424033	1	NCN 171825-3 Receptacle Male
UP-7640	CNP801	5428074	1	PCN 5258-03 3P
UP-7640	CNP802	5500922	1	CORD 170187-2 (300) Red
UP-7640	CNP804	5424924	1	PCN HKP22FS02-11BT(20)
UP-7640	CNP805	5500967	1	CORD 1-480722-0 (350)
UP-7640	CN801	1601866	1	TH SUP-B3G-E-2A LINEFILTER
UP-7640	C801-C802	3820901	2	FLC2 ECQ-U2A224MN
UP-7640	C803-C804	3801601	2	EC04 KM200VRSN560-35C
UP-7640	C805	3820893	1	FLC DAD2E 105K
UP-7640	C806	3801593	1	EC04 KME25VB47 25/47
UP-7640	C807	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7640	C808	3801495	1	EC04 KME35VB470 35/470
UP-7640	C809	3853304	1	CEC2 ECK-D3D102KBN 1000pF 2KV
UP-7640	C810-C812	3801486	3	EC04 KME25VB2200 25/2200
UP-7640	C813	3801512	1	EC04 ECEA1HG010S 50V1uF
UP-7640	C814-C815	3801593	2	EC04 KME25VB47 25/47
UP-7640	C816	3820884	1	FLC QYA 2A103K
UP-7640	C817	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7640	C818-C820	3801619	3	EC04 KME16VB1000 16/1000
UP-7640	C821	3801459	1	EC04 KME25VB-1000 1000uF
UP-7640	C822-C828	3801593	7	EC04 KME25VB47 25/47
UP-7640	C829	3801495	1	EC04 KME35VB470 35/470
UP-7640	C830	3801486	1	EC04 KME25VB2200 25/2200
UP-7640	C831	3801593	1	EC04 KME25VB47 25/47
UP-7640	C832	3801628	1	EC04 KME35VB1000 35/1000
UP-7640	C833-C834	3820884	2	FLC QYA 2A103K
UP-7640	C835	3801593	1	EC04 KME25VB47 25/47
UP-7640	C836	3820884	1	FLC QYA 2A103K
UP-7640	C837	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7640	C838	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7640	C839	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-7640	D801	0940484	1	DB	S4VB60
UP-7640	D802	1000525	1	ZD2	HZ12LB-2 (12.85V)
UP-7640	D803-D804	0910659	2	DP	V19G (1.0A 600V)
UP-7640	D805-D808	0910597	4	DP	V19C (1A200V 200NS)
UP-7640	D809	0940475	1	DB	S24LCA20
UP-7640	D810	1090187	1	ZD2	HZ9LC1
UP-7640	D811	0910597	1	DP	V19C (1A200V 200NS)
UP-7640	D812-D813	0800617	2	DP	1SS81
UP-7640	D814-D825	0910597	12	DP	V19C (1A200V 200NS)
UP-7640	D826	0800617	1	DP	1SS81
UP-7640	D827-D829	0800626	3	D	U19C
UP-7640	D830	0800617	1	DP	1SS81
UP-7640	D831	0910659	1	DP	V19G (1.0A 600V)
UP-7640	D832-D835	0800617	4	DP	1SS81
UP-7640	D836	1090258	1	ZD2	HZ6LB1
UP-7640	D837	0800617	1	DP	1SS81
UP-7640	FH801-FH802	5625396	2	FH	FEU 031.1681
UP-7640	F803-F806	5620846	4	FUSE	MC-3 (3A125V)
UP-7640	F807-F808	5620659	2	FUSE	F-1065 15A
UP-7640	IC801-IC802	1601893	2	MD	SWC-01
UP-7640	IC803	1302315	1	MIC	HD14011BP(MC14011BCP)
UP-7640	IC804	1302298	1	MIC	HD14001BP(MC14001BCP)
UP-7640	IC805	1250219	1	REG	HA17723 (723CJ.Yellow)
UP-7640	IC806	1251316	1	OPIC	uPC271C
UP-7640	IC807	1253706	1	REG	HA17806P Regulator
UP-7640	IC808	1252449	1	REG	MC7906CT
UP-7640	IC809	1253822	1	REG	HA178M12
UP-7640	L801-L802	3751183	2	CH	SKP-5-80
UP-7640	L803	3750986	1	CH	LH3-332K (3.3mH)
UP-7640	L804	3751192	1	CH	SKL-204
UP-7640	L805-L807	3751165	3	CH	LH3 102K 1000uH
UP-7640	L808	3751174	1	CH	LH3 222K 2200uH
UP-7640	L809-L810	3799505	2	L	LH5-102K 1mH
UP-7640	L812-L813	3788811	2	L	2643-000301
UP-7640	Q801	0400648	1	TRD	2SD799
UP-7640	Q802-Q803	0302504	2	TRC	2SC4237
UP-7640	Q804-Q805	0101445	2	TRA	2SA1020
UP-7640	Q806	0302433	1	TRC	2SC2324K
UP-7640	Q807-Q808	0101454	2	TRA	2SA1293
UP-7640	Q809	0101151	1	TRA	2SA1194K HFE;1000
UP-7640	Q810	0301853	1	TRC	2SC1815
UP-7640	Q811	0302219	1	TRC	2SC2562 0 or Y
UP-7640	Q812	0101196	1	TRA	2SA1015

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7640	Q813	0950598	1	SCR SF0R1B42 (0.1A100V)
UP-7640	RY801-RY802	3400277	2	RY MC12D1-0
UP-7640	R805	4093525	1	RM RGD5-2 4700HM
UP-7640	SW801	3250367	1	SW JPZ2120-0101
UP-7640	TH801-TH802	1705932	2	TH 5D-11
UP-7640	TH803	1705941	1	TH 2KD-5 25 C 2K
UP-7640	T801	3772294	1	PLTF PT7331A
UP-7640	T802	3772302	1	PLTF PT7332
UP-7640	T803-T804	3772311	2	PLTF PT7333
UP-7640	VR801	4160604	1	TPOT GF06P 5KOHM
UP-7640	VR802	4160792	1	TPOT GF06P 200 OHM
UP-7640	VR803	4160596	1	TPOT GF06P 1KOHM
UP-7640	VR804	4160792	1	TPOT GF06P 200 OHM
UP-7640	VR805-VR806	4160613	2	TPOT GF06P 10KOHM

UP-7682 DIP SW BD

UP-7682		5430721	1	CN LGY 6501-0101
UP-7682	CNP001	5427431	1	PCN M62-12-0017SA (30)
UP-7682	C700	3839641	1	FLC1 ECQ-B1H103JZ 0.01uF
UP-7682	SW701	3250376	1	SW BP-8 8DIP

UP-7720 SW REGULATOR

UP-7720		5415836	2	NCN 5167PBTL
UP-7720		5601314	4	SOKT F4034P FUSE HOLDER
UP-7720		5601323	2	SOKT RT807
UP-7720	CNJ801	5428065	1	PCN 5281-03A 3P
UP-7720	CNJ802-CNJ803	5427734	2	PCN 170267-1
UP-7720	CNJ804	5425139	1	PCN HKP-22MS-11BT
UP-7720	CNJ805	5414864	1	NCN 350543-1 4P
UP-7720	CNJ806-CNJ807	5427734	2	PCN 170267-1
UP-7720	CNJ808	5424024	1	NCN 171825-2 Receptacle Male
UP-7720	CNJ809	5424033	1	NCN 171825-3 Receptacle Male
UP-7720	CNP801	5428074	1	PCN 5258-03 3P
UP-7720	CNP802	5500922	1	CORD 170187-2 (300) Red
UP-7720	CNP804	5424924	1	PCN HKP22FS02-11BT(20)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7720	CNP805	5500967	1	CORD 1-480722-0 (350)
UP-7720	CN801	1601866	1	TH SUP-B3G-E-2A LINEFILTER
UP-7720	C801-C802	3820901	2	FLC2 ECQ-U2A224MN
UP-7720	C803-C804	3801601	2	EC04 KM200VRSN560-35C
UP-7720	C805	3820893	1	FLC DAD2E 105K
UP-7720	C306	3801593	1	EC04 KME25VB47 25/47
UP-7720	C807	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7720	C808	3801495	1	EC04 KME35VB470 35/470
UP-7720	C809	3853304	1	CEC2 ECK-D3D102KBN 1000pF 2KV
UP-7720	C810-C812	3801486	3	EC04 KME25VB2200 25/2200
UP-7720	C813	3801512	1	EC04 ECEA1HG010S 50V1uF
UP-7720	C814-C815	3801593	2	EC04 KME25VB47 25/47
UP-7720	C816	3820884	1	FLC QYA 2A103K
UP-7720	C817	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7720	C818-C820	3801619	3	EC04 KME16VB1000 16/1000
UP-7720	C821	3801459	1	EC04 KME25VB-1000 1000uF
UP-7720	C822-C828	3801593	7	EC04 KME25VB47 25/47
UP-7720	C829	3801495	1	EC04 KME35VB470 35/470
UP-7720	C830	3801486	1	EC04 KME25VB2200 25/2200
UP-7720	C831	3801593	1	EC04 KME25VB47 25/47
UP-7720	C832	3801628	1	EC04 KME35VB1000 35/1000
UP-7720	C833-C834	3820884	2	FLC QYA 2A103K
UP-7720	C835	3801593	1	EC04 KME25VB47 25/47
UP-7720	C836	3820884	1	FLC QYA 2A103K
UP-7720	C837	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7720	C838	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7720	C839	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7720	C841	3820919	1	FLC QYA2A472K
UP-7720	C842	3820884	1	FLC QYA 2A103K
UP-7720	C843	3801593	1	EC04 KME25VB47 25/47
UP-7720	D801	0940484	1	DB S4VB60
UP-7720	D802	1000525	1	ZD2 HZ12LB-2 (12.85V)
UP-7720	D803-D804	0910659	2	DP V19G (1.0A 600V)
UP-7720	D805-D808	0910597	4	DP V19C (1A200V 200NS)
UP-7720	D809	0940475	1	DB S24LCA20
UP-7720	D810	1090187	1	ZD2 HZ9LC1
UP-7720	D811	0910597	1	DP V19C (1A200V 200NS)
UP-7720	D812-D813	0800617	2	DP 1SS81
UP-7720	D814-D825	0910597	12	DP V19C (1A200V 200NS)
UP-7720	D826	0800617	1	DP 1SS81
UP-7720	D827-D829	0800626	3	D U19C
UP-7720	D830	0800617	1	DP 1SS81
UP-7720	D831	0910659	1	DP V19G (1.0A 600V)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION	
UP-7720	D832-D835	0800617	4	DP	1SS81
UP-7720	D836	1090258	1	ZD2	HZ6LB1
UP-7720	D837	0800617	1	DP	1SS81
UP-7720	FH801-FH802	5625396	2	FH	FEU 031.1681
UP-7720	F803-F806	5620846	4	FUSE	MC-3 (3A125V)
UP-7720	F807-F808	5620659	2	FUSE	F-1065 15A
UP-7720	IC801-IC802	1601893	2	MD	SWC-01
UP-7720	IC803	1302315	1	MIC	HD14011BP(MC14011BCP)
UP-7720	IC804	1302298	1	MIC	HD14001BP(MC14001BCP)
UP-7720	IC805	1250219	1	REG	HA17723 (723CJ.G)
UP-7720	IC806	1251316	1	OPIC	uPC271C
UP-7720	IC807	1253706	1	REG	HA17806P Regulator
UP-7720	IC808	1252449	1	REG	MC7906CT
UP-7720	IC809	1253822	1	REG	HA178M12
UP-7720	L801-L802	3751183	2	CH	SKP-5-80
UP-7720	L803	3750986	1	CH	LH3-332K (3.3mH)
UP-7720	L804	3751192	1	CH	SKL-204
UP-7720	L805-L807	3751165	3	CH	LH3 102K 1000uH
UP-7720	L808	3751174	1	CH	LH3 222K 2200uH
UP-7720	L809-L810	3799505	2	L	LH5-102K 1mH
UP-7720	L811	3788829	1	L	BL02RN2-R62
UP-7720	L812-L813	3788811	2	L	2643-000301
UP-7720	L814-L815	3788829	2	L	BL02RN2-R62
UP-7720	Q801	0400648	1	TRD	2SD799
UP-7720	Q802-Q803	0302255	2	TRC	2SC2792
UP-7720	Q804-Q805	0101445	2	TRA	2SA1020
UP-7720	Q806	0302433	1	TRC	2SC2324K
UP-7720	Q807-Q808	0101454	2	TRA	2SA1293
UP-7720	Q809	0101151	1	TRA	2SA1194K HFE;1000
UP-7720	Q810	0301853	1	TRC	2SC1815
UP-7720	Q811	0302219	1	TRC	2SC2562 0 or Y
UP-7720	Q812	0101196	1	TRA	2SA1015
UP-7720	Q813	0950598	1	SCR	SF0R1B42 (0.1A100V)
UP-7720	RY801-RY802	3400277	2	RY	MC12D1-0
UP-7720	R805	4093525	1	RM	RGD5-2 4700HM
UP-7720	SW801	3250367	1	SW	JPZ2120-0101
UP-7720	TH801-TH802	1705932	2	TH	5D-11
UP-7720	TH803	1705941	1	TH	2KD-5 25 C 2K
UP-7720	T801	3772347	1	T	PT36271A
UP-7720	T802	3772302	1	PLTF	PT7332
UP-7720	T803-T804	3772311	2	PLTF	PT7333
UP-7720	VR801	4160604	1	TPOT	GF06P 5KOHM
UP-7720	VR802	4160792	1	TPOT	GF06P 200 OHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7720	VR803	4160596	1	TPOT GF06P 1KOHM
UP-7720	VR804	4160792	1	TPOT GF06P 200 OHM
UP-7720	VR805-VR806	4160613	2	TPOT GF06P 10KOHM
UP-7720	VR807	4160676	1	TPOT GF06P 50KOHM

UP-7720G SW REGULATOR

UP-7720G		5415836	2	NCN 5167PBTL
UP-7720G		5601314	4	SOKT F4034P FUSE HOLDER
UP-7720G		5601323	2	SOKT RT807
UP-7720G	CNJ801	5428065	1	PCN 5281-03A 3P
UP-7720G	CNJ802-CNJ803	5427734	2	PCN 170267-1
UP-7720G	CNJ804	5425139	1	PCN HKP-22MS-11BT
UP-7720G	CNJ805	5414864	1	NCN 350543-1 4P
UP-7720G	CNJ806-CNJ807	5427734	2	PCN 170267-1
UP-7720G	CNJ808	5424024	1	NCN 171825-2 Receptacle Male
UP-7720G	CNJ809	5424033	1	NCN 171825-3 Receptacle Male
UP-7720G	CNP801	5428074	1	PCN 5258-03 3P
UP-7720G	CNP802	5500922	1	CORD 170187-2 (300) Red
UP-7720G	CNP804	5424924	1	PCN HKP22FS02-11BT(20)
UP-7720G	CNP805	5500967	1	CORD 1-480722-0 (350)
UP-7720G	CN801	1601866	1	TH SUP-B3G-E-2A LINEFILTER
UP-7720G	C801-C802	3820901	2	FLC2 ECQ-U2A224MN
UP-7720G	C803-C804	3801601	2	EC04 KM200VRSN560-35C
UP-7720G	C805	3820893	1	FLC DAD2E 105K
UP-7720G	C806	3801593	1	EC04 KME25VB47 25/47
UP-7720G	C807	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7720G	C808	3801495	1	EC04 KME35VB470 35/470
UP-7720G	C809	3853304	1	CEC2 ECK-D3D102KBN 1000pF 2KV
UP-7720G	C810-C812	3801486	3	EC04 KME25VB2200 25/2200
UP-7720G	C813	3801512	1	EC04 ECEA1HG010S 50V1uF
UP-7720G	C814-C815	3801593	2	EC04 KME25VB47 25/47
UP-7720G	C816	3820884	1	FLC QYA 2A103K
UP-7720G	C817	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7720G	C818-C820	3801619	3	EC04 KME16VB1000 16/1000
UP-7720G	C821	3801459	1	EC04 KME25VB-1000 1000uF
UP-7720G	C822-C828	3801593	7	EC04 KME25VB47 25/47
UP-7720G	C829	3801495	1	EC04 KME35VB470 35/470
UP-7720G	C830	3801486	1	EC04 KME25VB2200 25/2200
UP-7720G	C831	3801593	1	EC04 KME25VB47 25/47

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7720G	C832	3801628	1	EC04 KME35VB1000 35/1000
UP-7720G	C833-C834	3820884	2	FLC QYA 2A103K
UP-7720G	C835	3801593	1	EC04 KME25VB47 25/47
UP-7720G	C836	3820884	1	FLC QYA 2A103K
UP-7720G	C837	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7720G	C838	3801503	1	EC04 KME50VB4.7 50/4.7
UP-7720G	C839	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7720G	C841	3820919	1	FLC QYA2A472K
UP-7720G	C842	3820884	1	FLC QYA 2A103K
UP-7720G	C843	3801593	1	EC04 KME25VB47 25/47
UP-7720G	D801	0940484	1	DB S4VB60
UP-7720G	D802	1000525	1	ZD2 HZ12LB-2 (12.85V)
UP-7720G	D803-D804	0910659	2	DP V19G (1.0A 600V)
UP-7720G	D805-D808	0910597	4	DP V19C (1A200V 200NS)
UP-7720G	D809	0940475	1	DB S24LCA20
UP-7720G	D810	1090187	1	ZD2 HZ9LC1
UP-7720G	D811	0910597	1	DP V19C (1A200V 200NS)
UP-7720G	D812-D813	0800617	2	DP 1SS81
UP-7720G	D814-D825	0910597	12	DP V19C (1A200V 200NS)
UP-7720G	D826	0800617	1	DP 1SS81
UP-7720G	D827-D829	0800626	3	D U19C
UP-7720G	D830	0800617	1	DP 1SS81
UP-7720G	D831	0910659	1	DP V19G (1.0A 600V)
UP-7720G	D832-D835	0800617	4	DP 1SS81
UP-7720G	D836	1090258	1	ZD2 HZ6LB1
UP-7720G	D837	0800617	1	DP 1SS81
UP-7720G	D838	1090258	1	ZD2 HZ6LB1
UP-7720G	FH801-FH802	5625396	2	FH FEU 031.1681
UP-7720G	F803-F806	5620846	4	FUSE MC-3 (3A125V)
UP-7720G	F807-F808	5620659	2	FUSE F-1065 15A
UP-7720G	IC801-IC802	1601893	2	MD SWC-01
UP-7720G	IC803	1302315	1	MIC HD14011BP(MC14011BCP)
UP-7720G	IC804	1302298	1	MIC HD14001BP(MC14001BCP)
UP-7720G	IC805	1250219	1	REG HA17723 (723CJ.G)
UP-7720G	IC806	1251316	1	OPIC uPC271C
UP-7720G	IC807	1253706	1	REG HA17806P Regulator
UP-7720G	IC808	1252449	1	REG MC7906CT
UP-7720G	IC809	1253822	1	REG HA178M12
UP-7720G	IC810	1252262	1	AIC uPC393C (LM393N)
UP-7720G	L801-L802	3751183	2	CH SKP-5-80
UP-7720G	L803	3750986	1	CH LH3-332K (3.3mH)
UP-7720G	L804	3751192	1	CH SKL-204
UP-7720G	L805-L807	3751165	3	CH LH3 102K 1000uH

ASSY	CKT NO.	PART NO.	Q'TY		DESCRIPTION
UP-7720G	L808	3751174	1	CH	LH3 222K 2200uH
UP-7720G	L809-L810	3799505	2	L	LH5-102K 1mH
UP-7720G	L811	3788829	1	L	BL02RN2-R62
UP-7720G	L812-L813	3788811	2	L	2643-000301
UP-7720G	L814-L815	3788829	2	L	BL02RN2-R62
UP-7720G	Q801	0400648	1	TRD	2SD799
UP-7720G	Q802-Q803	0302504	2	TRC	2SC4237
UP-7720G	Q804-Q805	0101445	2	TRA	2SA1020
UP-7720G	Q806	0302433	1	TRC	2SC2324K
UP-7720G	Q807-Q808	0101454	2	TRA	2SA1293
UP-7720G	Q809	0101151	1	TRA	2SA1194K HFE;1000
UP-7720G	Q810	0301853	1	TRC	2SC1815
UP-7720G	Q811	0302219	1	TRC	2SC2562 0 or Y
UP-7720G	Q812	0101196	1	TRA	2SA1015
UP-7720G	Q813	0950598	1	SCR	SFOR1B42 (0.1A100V)
UP-7720G	Q814	0101196	1	TRA	2SA1015
UP-7720G	RY801-RY802	3400277	2	RY	MC12D1-0
UP-7720G	R805	4093525	1	RM	RGD5-2 470ohm
UP-7720G	SW801	3250367	1	SW	JPZ2120-0101
UP-7720G	TH801-TH802	1705932	2	TH	5D-11
UP-7720G	TH803	1705941	1	TH	2KD-5 25 C 2K
UP-7720G	T801	3772347	1	T	PT36271A
UP-7720G	T802	3772302	1	PLTF	PT7332
UP-7720G	T803-T804	3772311	2	PLTF	PT7333
UP-7720G	VR801	4160604	1	TPOT	GF06P 5KOHM
UP-7720G	VR802	4160792	1	TPOT	GF06P 200 OHM
UP-7720G	VR803	4160596	1	TPOT	GF06P 1KOHM
UP-7720G	VR804	4160792	1	TPOT	GF06P 200 OHM
UP-7720G	VR805-VR806	4160613	2	TPOT	GF06P 10KOHM
UP-7720G	VR807	4160827	1	TPOT	GF06P 500KOHM

UP-7737 ECG/CPU BD

UP-7737	CNJ100	5427663	1	PCN	M60-12-30-114P	STRAIGHT
UP-7737	CNJ105	5427672	1	PCN	M60-15-30-114P	STRAIGHT
UP-7737	CNJ106	5427173	1	PCN	HIF3F-40PADSA	40P
UP-7737	CNJ108	5425139	1	PCN	HKP-22MS-11BT	
UP-7737	CNJ110	5427663	1	PCN	M60-12-30-114P	STRAIGHT
UP-7737	CNJ116	5427663	1	PCN	M60-12-30-114P	STRAIGHT

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7737	CNJ157	5427743	1	PCN HIF3F-34PA-2.54DSA
UP-7737	CNJ303	5427672	1	PCN M60-15-30-114P STRAIGHT
UP-7737	CNJ355	5427636	1	PCN M60-03-30-114P STRAIGHT
UP-7737	C100-C101	3820768	2	FLC1 454M6302 104K
UP-7737	C103-C109	3820768	7	FLC1 454M6302 104K
UP-7737	C111-C113	3820768	3	FLC1 454M6302 104K
UP-7737	C120	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7737	C121	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-7737	C122	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7737	C123	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7737	C124	3839561	1	FLC1 ECQ-B1H222JZ 0.0022uF
UP-7737	C125-C126	3839793	2	FLC1 ECQ-V1H224JZ 0.22uF
UP-7737	C127	3800469	1	EC04 ECEA1HS010 50V1uF
UP-7737	C128	3839686	1	FLC1 ECQ-B1H223JZ 0.022uF
UP-7737	C129	3851137	1	CEC2 DD05B331K500 500V330pF
UP-7737	C130	3851119	1	CEC2 DD05B151K500 500V150pF
UP-7737	C201-C206	3820768	6	FLC1 454M6302 104K
UP-7737	C207-C210	3839641	4	FLC1 ECQ-B1H103JZ 0.01uF
UP-7737	C211-C218	3820768	8	FLC1 454M6302 104K
UP-7737	C220-C221	3820768	2	FLC1 454M6302 104K
UP-7737	C230-C231	3839525	2	FLC1 ECQ-B1H102JZ 0.001uF
UP-7737	C232	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7737	C233	3839525	1	FLC1 ECQ-B1H102JZ 0.001uF
UP-7737	C234	3839641	1	FLC1 ECQ-B1H103JZ 0.01uF
UP-7737	C241-C242	3839525	2	FLC1 ECQ-B1H102JZ 0.001uF
UP-7737	C243	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7737	C250-C251	3839873	2	FLC1 ECQ-V1H105JZ 1.0uF
UP-7737	C252	3839721	1	FLC1 ECQ-V1H473JZ 0.047uF
UP-7737	C253	3851155	1	CEC2 DD06B681K500 500V680pF
UP-7737	C254	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7737	C255	3820768	1	FLC1 454M6302 104K
UP-7737	C256	3839641	1	FLC1 ECQ-B1H103JZ 0.01uF
UP-7737	C257-C270	3820768	14	FLC1 454M6302 104K
UP-7737	C271-C272	3800219	2	EC04 ECEA1CS470 16V47uF
UP-7737	C273	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-7737	C274	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-7737	C275	3839721	1	FLC1 ECQ-V1H473JZ 0.047uF
UP-7737	C280	3820768	1	FLC1 454M6302 104K
UP-7737	C301-C304	3839525	4	FLC1 ECQ-B1H102JZ 0.001uF
UP-7737	C305	3839819	1	FLC1 ECQ-V1H334JZ 0.33uF
UP-7737	C306	3839641	1	FLC1 ECQ-B1H103JZ 0.01uF
UP-7737	C307	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7737	C309-C310	3800371	2	EC04 ECEA1VS100 35V10uF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION	
UP-7737	C311	3839525	1	FLC1	ECQ-B1H102JZ 0.001uF
UP-7737	C312	3839739	1	FLC1	ECQ-V1H683JZ 0.068uF
UP-7737	C313-C314	3839819	2	FLC1	ECQ-V1H334JZ 0.33uF
UP-7737	C315-C316	3839757	2	FLC1	ECQ-V1H104JZ 0.1uF
UP-7737	C351-C352	3839641	2	FLC1	ECQ-B1H103JZ 0.01uF
UP-7737	C353	3839873	1	FLC1	ECQ-V1H105JZ 1.0uF
UP-7737	C354	3839525	1	FLC1	ECQ-B1H102JZ 0.001uF
UP-7737	C355-C356	3800371	2	EC04	ECEA1VS100 35V10uF
UP-7737	C401	3851119	1	CEC2	DD05B151K500 500V150pF
UP-7737	C402-C407	3820768	6	FLC1	454M6302 104K
UP-7737	DA101	0950571	1	D	MA430
UP-7737	DA102	0950544	1	D	MA423 Cathode common
UP-7737	DA103	0950553	1	D	MA424 Anode common
UP-7737	DA104	0950544	1	D	MA423 Cathode common
UP-7737	DA105	0950553	1	D	MA424 Anode common
UP-7737	DA201	0950544	1	D	MA423 Cathode common
UP-7737	DA202	0950553	1	D	MA424 Anode common
UP-7737	DA231	0950553	1	D	MA424 Anode common
UP-7737	DA232	0950544	1	D	MA423 Cathode common
UP-7737	DA233	0950553	1	D	MA424 Anode common
UP-7737	D100-D103	4322528	4	D	1S2076ARE
UP-7737	D106-D108	4322528	3	D	1S2076ARE
UP-7737	D201-D216	0800564	16	D	1SS237
UP-7737	D217-D218	4322528	2	D	1S2076ARE
UP-7737	D219	0800564	1	D	1SS237
UP-7737	D220-D231	4322528	12	D	1S2076ARE
UP-7737	D232	0800092	1	D	0A91(1S1005)
UP-7737	D241-D242	4322528	2	D	1S2076ARE
UP-7737	D253-D257	4322528	5	D	1S2076ARE
UP-7737	D258-D259	0800644	2	D	1SV126
UP-7737	D260-D261	4322528	2	D	1S2076ARE
UP-7737	D301-D302	4322528	2	D	1S2076ARE
UP-7737	D303-D304	1000258	2	ZD2	HZ9C1 500mW 9.2mA
UP-7737	D305-D314	0800644	10	D	1SV126
UP-7737	D351-D354	4322528	4	D	1S2076ARE
UP-7737	D355-D356	1000258	2	ZD2	HZ9C1 500mW 9.2mA
UP-7737	D357-D358	4322528	2	D	1S2076ARE
UP-7737	D401	4322528	1	D	1S2076ARE
UP-7737	GA351	2100335	1	GA	B1C90 (90V)
UP-7737	ICS103	5422846	1	SOKT	IC SOCKET DL-2-28A (01)
UP-7737	ICS107	5601279	1	SOKT	208-93-764 64PIC SOCKET
UP-7737	ICS201	5601279	1	SOKT	208-93-764 64PIC SOCKET
UP-7737	ICS203	5422846	1	SOKT	IC SOCKET DL-2-28A (01)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7737	ICS405	5601279	1	SOKT 208-93-764 64PIC SOCKET
UP-7737	ICS413	5422846	1	SOKT IC SOCKET DL-2-28A (01)
UP-7737	IC101	1205786	1	CPU uPD71055C(82C55A-2)
UP-7737	IC102	1302859	1	CPU uPD8279C-2
UP-7737	IC104	1207222	1	CPU DC-HOST (GAL 16V8-25LP)
UP-7737	IC105	1253403	1	AIC TL7700C
UP-7737	IC106	1303528	1	MIC uPD74HC123C(HD74HC123P)
UP-7737	IC107	1207721	1	CPU HD63C03Y (3MHZ)
UP-7737	IC108	1303074	1	MIC uPD74HC4040C(HD74HC4040P)
UP-7737	IC109	1302943	1	MIC uPD74HC08C(HD74HC08P)
UP-7737	IC110	1302975	1	MIC HD74HC32P(uPD74HC32C)
UP-7737	IC112	1203752	1	TIC SN74LS365
UP-7737	IC114	1252752	1	OPIC HA17082PS 2FET
UP-7737	IC115	1302948	1	MIC uPD74HC08C(HD74HC08P)
UP-7737	IC116	1302912	1	MIC HD74HC00P(uPD74HC00C)
UP-7737	IC120	1206473	1	CPU MB84256-10LP-G
UP-7737	IC121	1302912	1	MIC HD74HC00P(uPD74HC00C)
UP-7737	IC201	1207721	1	CPU HD63C03Y (3MHZ)
UP-7737	IC202	1253501	1	ADIC uPD-7004C8CH10BITA/D
UP-7737	IC204	1206473	1	CPU MB84256-10LP-G
UP-7737	IC205	1303065	1	MIC HD74HC245P(uPD74HC245C)
UP-7737	IC206-IC207	1303056	2	MIC HD74HC244P(uPD74HC244C)
UP-7737	IC208	1302993	1	MIC HD74HC139P(uPD74HC139C)
UP-7737	IC209	1302939	1	MIC HD74HC04P(uPD74HC04C)
UP-7737	IC210	1302912	1	MIC HD74HC00P(uPD74HC00C)
UP-7737	IC211	1302975	1	MIC HD74HC32P(uPD74HC32C)
UP-7737	IC212	1303243	1	MIC HD74HC374P(uPD74HC374C)
UP-7737	IC230	1300629	1	MIC HD14052BP(MC14052BCP)
UP-7737	IC250	1300629	1	MIC HD14052BP(MC14052BCP)
UP-7737	IC251	1601875	1	MD NP2014B
UP-7737	IC252	1300611	1	MIC HD14051BP(MC14051BCP)
UP-7737	IC253	1300638	1	MIC HD14053BP(MC14053BCP)
UP-7737	IC254-IC255	1253118	2	OPIC uPC324C QUAD
UP-7737	IC256	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-7737	IC257	1300638	1	MIC HD14053BP(MC14053BCP)
UP-7737	IC258	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-7737	IC301-IC302	1252084	2	OPIC TL072CP
UP-7737	IC303-IC305	1300611	3	MIC HD14051BP(MC14051BCP)
UP-7737	IC306	1253724	1	OPIC uPC4570C
UP-7737	IC307	1251165	1	OPIC uPC1458C
UP-7737	IC308	1251904	1	AIC MB4204 (uPC339C)
UP-7737	IC309	1300629	1	MIC HD14052BP(MC14052BCP)
UP-7737	IC310	1251601	1	REG uPC78L05J (NJM78L05A)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7737	IC311	1252494	1	REG uPC79L05J (NJM79L05A)
UP-7737	IC351	1252084	1	OPIC TL072CP
UP-7737	IC352	1300629	1	MIC HD14052BP(MC14052BCP)
UP-7737	IC401-IC402	1303056	2	MIC HD74HC244P(uPD74HC244C)
UP-7737	IC403	1303065	1	MIC HD74HC245P(uPD74HC245C)
UP-7737	IC404	1206473	1	CPU MB84256-10LP-G
UP-7737	IC405	1205768	1	CPU HD63B03XP
UP-7737	IC406	1251174	1	ADIC uPC624C (DAC-08CQ)
UP-7737	IC408	1300522	1	MIC HD14042BP (MC14042BCP)
UP-7737	IC409	1303546	1	MIC HD74HC151P (uPD74HC151C)
UP-7737	IC410	1303074	1	MIC uPD74HC4040C(HD74HC4040P)
UP-7737	IC411	1302921	1	MIC uPD74HC02C(HD74HC02P)
UP-7737	IC412	1303412	1	MIC SN74HC03N(uPD74HC03C)
UP-7737	PC301	0600254	1	TRP PC837
UP-7737	PC302	1704345	1	TRP PC817 PHOTOCOUPLER
UP-7737	Q230-Q231	0300613	2	TRC 2SC1213AK-D(2SC1781H-B-C)
UP-7737	Q240-Q241	0300613	2	TRC 2SC1213AK-D(2SC1781H-B-C)
UP-7737	Q250	0100107	1	TRA 2SA495G-Y Yellow
UP-7737	Q251	0300613	1	TRC 2SC1213AK-D(2SC1781H-B-C)
UP-7737	Q252	0101124	1	TRA 2SA836 C or D
UP-7737	RA100	4090582	1	RM EXB-P84-103J
UP-7737	RA101	4090813	1	RM EXB-P88-103J
UP-7737	RA102	4090582	1	RM EXB-P84-103J
UP-7737	RA104	4090813	1	RM EXB-P88-103J
UP-7737	RA105-RA106	4091153	2	RM EXB-T44-101J
UP-7737	RA201-RA202	4092624	2	RM EXB-T44-472J 4.7 KOHM
UP-7737	RA203	4090822	1	RM EXB-P88-472J
UP-7737	RA204	4090787	1	RM EXB-P88-104J
UP-7737	RA206	4090813	1	RM EXB-P88-103J
UP-7737	RA230	4091884	1	RM EXB-P84-472J
UP-7737	RA301	4093338	1	RM CMR-042B 20.0K OHM
UP-7737	RA302	4093347	1	RM CMR-042A 30.1K OHM
UP-7737	RA303	4090689	1	RM EXB-P84-473J
UP-7737	RA304	4093356	1	RM EXB-F8V-154J
UP-7737	RA305-RA306	4091572	2	RM EXB-T44-103J
UP-7737	RA401	4092517	1	RM EXB-P88-332J 3.3 KOHMX8
UP-7737	SW102	3350838	1	DSW DSS102
UP-7737	T301	3772285	1	PLTF EP17 50KHZ SIG Yellow
UP-7737	T302	3772409	1	PLTF EP17 5V TO 7V Red
UP-7737	T351	3772258	1	PLTF EP13 50KHZ SIG Yellow
UP-7737	T352	3772276	1	PLTF EP13 50KHZ DC-DC Red
UP-7737	VR101	4160685	1	TPOT GF06P 100KOHM
UP-7737	VR251	4160596	1	TPOT GF06P 1KOHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7737	VR252	4160667	1	TPOT GF06P 20KOHM
UP-7737	VR253	4160827	1	TPOT GF06P 500KOHM
UP-7737	VR254	4160667	1	TPOT GF06P 20KOHM
UP-7737	VR255	4160604	1	TPOT GF06P 5KOHM
UP-7737	X100	1750927	1	XTAL TD308C(XC0-B)8MHZ
UP-7737	X200	1706004	1	XTAL TD 308C XC0-B 12MHZ
UP-7737	ZD250	1253519	1	REG LT1009CZ 2.5VREF
UP-7737	ZD251	1090329	1	ZD2 HZ6C1 6V
UP-7737	ZD252	1000534	1	ZD1 HZ3B-2 500mW 3.0V
UP-7737	CNJ101	5445474	1	PCN IL-2P-S3FP2-1
UP-7737	C151	3851066	1	CEC2 DD05SL220K500 500V22pF
UP-7737	C152	3890353	1	ECR-GA035M11-35pF
UP-7737	C153	3839837	1	FLC1 ECQ-V1H474JZ 0.47uF
UP-7737	C381-C382	3839793	2	FLC1 ECQ-V1H224JZ 0.22uF
UP-7737	C383	3810832	1	TC04 204M3502 105M4 (1uF/35V)
UP-7737	C384	3839721	1	FLC1 ECQ-V1H473JZ 0.047uF
UP-7737	C385	3839703	1	FLC1 ECQ-V1H333JZ 0.033uF
UP-7737	C386-C387	3820768	2	FLC1 454M6302 104K
UP-7737	D151-D153	4322528	3	D 1S2076ARE
UP-7737	D381-D382	4322528	2	D 1S2076ARE
UP-7737	IC151	1303662	1	CPU MSM6242 RS
UP-7737	IC380	1300638	1	MIC HD14053BP(MC14053BCP)
UP-7737	IC381	1252752	1	OPIC HA17082PS 2FET
UP-7737	T381	3772258	1	PLTF EP13 50KHZ SIG Yellow
UP-7737	VR381	4160827	1	TPOT GF06P 500KOHM
UP-7737	X151	1702597	1	XTAL KF38G 32.768KHZ

UP-7738 MOTOR CONTROL BD

UP-7738	CNJ700	5427672	1	PCN M60-15-30-114P STRAIGHT
UP-7738	CNJ706	5427663	1	PCN M60-12-30-114P STRAIGHT
UP-7738	CNJ710	5423195	1	PCN HKP-20MS-10BT
UP-7738	CNJ716	5427636	1	PCN M60-03-30-114P STRAIGHT
UP-7738	C700-C701	3800371	2	EC04 ECEA1VS100 35V10uF
UP-7738	C702	3839721	1	FLC1 ECQ-V1H473JZ 0.047uF
UP-7738	C703	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7738	C704	3820001	1	FLC1 MFL5002-102K 50V0.001uF
UP-7738	C705	3801405	1	EC04 ECES1CV153S
UP-7738	C706	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7738	C707	3800201	1	EC04 ECEA1CS220 16V22uF
UP-7738	C708	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7738	C711	3810502	1	TC04 ECSZ35HS6R8(242M3502-685M
UP-7738	C712	3800389	1	EC04 ECEA1VS220 35V22uF
UP-7738	C713	3800219	1	EC04 ECEA1CS470 16V47uF
UP-7738	C714-C715	3839757	2	FLC1 ECQ-V1H104JZ 0.1uF
UP-7738	C716	3810877	1	TC04 204M3502 475M4(4.7uF/35V)
UP-7738	C717	3839819	1	FLC1 ECQ-V1H334JZ 0.33uF
UP-7738	D700	1000383	1	ZD1 HZ3C3 500mW 3.3V
UP-7738	D704-D705	0800172	2	D 1S2076A(1S953(3)1S954)
UP-7738	IC700	1252262	1	AIC uPC393C (LM393N)
UP-7738	IC701	1251512	1	REG HA178M05
UP-7738	IC702	1300567	1	MIC HD14046BP(MC14046BCP)
UP-7738	IC703	1251601	1	REG uPC78L05J (NJM78L05A)
UP-7738	IC704	1250148	1	OPIC HA17741 PS(GS)(741T,C151)
UP-7738	IC705	1300638	1	MIC HD14053BP(MC14053BCP)
UP-7738	L701	3788063	1	L LF1-101K 100uH
UP-7738	Q700-Q703	0300596	4	TRC 2SC1345K-D(2SC1707H-C)
UP-7738	Q704	0100107	1	TRA 2SA495G-Y Yellow
UP-7738	Q705	0400488	1	TRD 2SD768K with SK16B YC40B
UP-7738	Q706	0100107	1	TRA 2SA495G-Y Yellow
UP-7738	SW700	3350838	1	DSW DSS102
UP-7738	VR700	4160925	1	TPOT GF-06S(ET-6S) 20KOHM
UP-7738	VR701	4160952	1	TPOT GF-06S(ET-6S) 2KOHM
UP-7738	VR702	4160925	1	TPOT GF-06S(ET-6S) 20KOHM
UP-7738	VR703	4160997	1	TPOT GF-06S(ET-6S)100KOHM

UP-7740 CRT DRIVER

UP-7740	AR601-AR602	1704559	2	TH T08-230B Arrestor
UP-7740	CNJ600	5422338	1	PCN HKP-10M5S-9T
UP-7740	CNJ607	5427716	1	PCN M60-12-30-134
UP-7740	CNJ610	5420982	1	ACN2 A3-705B-00P 3P MALE 3Q
UP-7740	CNJ617	5427681	1	PCN M60-03-30-134
UP-7740	CNJ620	5427654	1	PCN M60-09-30-114P STRAIGHT
UP-7740	CNJ630	5427725	1	PCN M60-15-30-134
UP-7740	C601	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7740	C603	3839525	1	FLC1 ECQ-B1H102JZ 0.001uF
UP-7740	C604	3839561	1	FLC1 ECQ-B1H222JZ 0.0022uF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7740	C605	3851128	1	CEC2 DD05B221K500 500V220pF
UP-7740	C610	3839837	1	FLC1 ECQ-V1H474JZ 0.47uF
UP-7740	C611-C612	3810502	2	TC04 ECSZ35HS6R8(242M3502-685M
UP-7740	C613-C614	3800219	2	EC04 ECEA1CS470 16V47uF
UP-7740	C615-C616	3320028	2	FLC1 MFL5002-222K 50V0.0022uF
UP-7740	C618-C619	3800219	2	EC04 ECEA1CS470 16V47uF
UP-7740	C620-C625	3820768	6	FLC1 454M6302 104K
UP-7740	C626-C627	3800406	2	EC04 ECEA1HS470 50V47uF
UP-7740	C630-C631	3800228	2	EC04 ECEA1CS101 16V100uF
UP-7740	C632	3800371	1	EC04 ECEA1VS100 35V10uF
UP-7740	C633-C634	3810502	2	TC04 ECSZ35HS6R8(242M3502-685M
UP-7740	C651	3839525	1	FLC1 ECQ-R1H102JZ 0.001uF
UP-7740	DA601	0950544	1	D MA423 Cathode common
UP-7740	DA602	0950553	1	D MA424 Anode common
UP-7740	DA604	0950571	1	D MA430
UP-7740	D602-D603	0800172	2	D 1S2076A(1S953(3)1S954)
UP-7740	D604	1000383	1	ZD1 HZ3C3 500mW 3.3V
UP-7740	D607	1000383	1	ZD1 HZ3C3 500mW 3.3V
UP-7740	D616-D622	0800172	7	D 1S2076A(1S953(3)1S954)
UP-7740	IC601	1252752	1	OPIC HA17082PS 2FET
UP-7740	IC602	1300629	1	MIC HD14052BP(MC14052BCP)
UP-7740	IC603	1252752	1	OPIC HA17082PS 2FET
UP-7740	IC604	1253698	1	OPIC uPC 811C (LF 411CN)
UP-7740	IC605	1300629	1	MIC HD14052BP(MC14052BCP)
UP-7740	IC606	1253698	1	OPIC uPC 811C (LF 411CN)
UP-7740	IC607	1252752	1	OPIC HA17082PS 2FET
UP-7740	IC608	1301601	1	MIC HD14538BP (MC14538BCP)
UP-7740	L601	3751129	1	CH LH5-562
UP-7740	L602-L605	3780044	4	L LF5-471K
UP-7740	Q601	0301416	1	TRC 2SC372G-Y
UP-7740	Q603	0400488	1	TRD 2SD768K with SK16B YC40B
UP-7740	Q604	0200463	1	TRB 2SB727K with SK16B,YC40B
UP-7740	Q605	0400488	1	TRD 2SD768K with SK16B YC40B
UP-7740	Q606	0200463	1	TRB 2SB727K with SK16B,YC40B
UP-7740	Q607	0400488	1	TRD 2SD768K with SK16B YC40B
UP-7740	Q608	0200463	1	TRB 2SB727K with SK16B,YC40B
UP-7740	Q610	0100241	1	TRA 2SA673AK-C(2SA876H-B-C)
UP-7740	RA601	4090831	1	RM EXB-T44-102J
UP-7740	VR601	4160809	1	TPOT GF06P 2KOHM
UP-7740	VR602-VR606	4160667	5	TPOT GF06P 20KOHM
UP-7740	VR608	4160827	1	TPOT GF06P 500KOHM
UP-7740	VR609	4160854	1	TPOT RJ-6P 5MOHM
UP-7746	CNJ611	5427716	1	PCN M60-12-30-134

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

UP-7746	I/O CONNECTOR BD
---------	------------------

UP-7746	CNJ640	5427716	1	PCN	M60-12-30-134
UP-7746	CNP116	5427476	1	PCN	M62-12-3039SA-1 (20)

UP-7850	RELAY BD
---------	----------

UP-7850	CNJ585	5424256	1	NCN	2-171825-4 Receptacle Male
UP-7850	CNP575	5416309	1	NCN	5195-2 HOUSING
UP-7850	CNP575	5416318	2	NCN	5194TL TERMINAL
UP-7850	CNP585	5415551	8	NCN	Pin 170204-2
UP-7850	CNP585	5424265	2	NCN	2-171822-4 PLUG FEMALE
UP-7850	RLY502-RLY503	3400384	2	RY	HV Relay NKR-102G 8KV 80mA

UP-7851	HIGH VOLTAGE BD
---------	-----------------

UP-7851		5491361	1	CHEM	HEAT SINK SHEET TO-3P2 TC30AG(F-1)
UP-7851	CNJ501	5427672	1	PCN	M60-15-30-114P STRAIGHT
UP-7851	CNJ511	5414864	1	NCN	350543-1 4P
UP-7851	CNJ515	5424024	1	NCN	171825-2 Receptacle Male
UP-7851	CNJ525	5424033	1	NCN	171825-3 Receptacle Male
UP-7851	CNJ535	5427734	1	PCN	170267-1
UP-7851	CNJ545	5427734	1	PCN	170267-1
UP-7851	CNJ555	5427681	1	PCN	M60-03-30-134
UP-7851	CNJ565	5424256	1	NCN	2-171825-4 Receptacle Male
UP-7851	CNJ575	5416327	1	NCN	5273-2A
UP-7851	C500	3851146	1	CEC2	DD05B471K500 500V470pF
UP-7851	C501	3800469	1	EC04	ECEA1HS010 50V1uF
UP-7851	C502	3839605	1	FLC1	ECQ-B1H472JZ 0.0047uF
UP-7851	C503	3801245	1	EC04	ECEA1VU 102
UP-7851	C504	3800193	1	EC04	ECEA1CS100 16V10uF
UP-7851	C505	3839757	1	FLC1	ECQ-V1H104JZ 0.1uF
UP-7851	C506	3800237	1	EC04	ECEA1CS221 16V220uF
UP-7851	C507	3801414	1	EC04	ECES1EU682G 25V6800uF
UP-7851	C509	3800469	1	EC04	ECEA1HS010 50V1uF

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-7851	C510	3839757	1	FLC1 ECQ-V1H104JZ 0.1uF
UP-7851	C514	3859147	1	CEC2 10MDQ222M
UP-7851	C515	3839605	1	FLC1 ECQ-B1H472JZ 0.0047uF
UP-7851	C516	3839819	1	FLC1 ECQ-V1H334JZ 0.33uF
UP-7851	C517-C520	3839757	4	FLC1 ECQ-V1H104JZ 0.1uF
UP-7851	C721	3839641	1	FLC1 ECQ-B1H103JZ 0.01uF
UP-7851	C722-C723	3810502	2	TC04 ECSZ35HS6R8(242M3502-685M
UP-7851	C724	3839703	1	FLC1 ECQ-V1H333JZ 0.033uF
UP-7851	C725	3839525	1	FLC1 ECQ-B1H102JZ 0.001uF
UP-7851	D500-D502	4322528	3	D 1S2076ARE
UP-7851	D503-D504	0910008	2	DP SR1FM8 800mA 400V
UP-7851	D506-D509	4322528	4	D 1S2076ARE
UP-7851	D510-D513	1101006	4	DP RC2 2007A 2KV
UP-7851	D515	0910008	1	DP SR1FM8 800mA 400V
UP-7851	D517	0910008	1	DP SR1FM8 800mA 400V
UP-7851	D518-D522	4322528	5	D 1S2076ARE
UP-7851	D720-D721	4322528	2	D 1S2076ARE
UP-7851	IC501	1253047	1	REG TL494CN SW REG
UP-7851	IC502	1300112	1	MIC MC14001UBCP (CD4001UBE)
UP-7851	IC503	1300638	1	MIC HD14053BP(MC14053BCP)
UP-7851	IC504	1253109	1	OPIC uPC358C DUAL
UP-7851	IC505	1253706	1	REG HA17806P Regulator
UP-7851	IC506	1252449	1	REG MC7906CT
UP-7851	IC720	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-7851	L501-L502	3788009	2	L LF1-101K
UP-7851	Q500	0400568	1	TRD 2SD1271
UP-7851	Q501	0200499	1	TRB 2SB946
UP-7851	Q502	0400621	1	TRD 2SD1038
UP-7851	Q503	0400434	1	TRD 2SD571 L or M
UP-7851	Q504-Q506	0300596	3	TRC 2SC1345K-D(2SC1707H-C)
UP-7851	Q507	0200499	1	TRB 2SB946
UP-7851	RLY501	3430707	1	RY HV Relay NKR-102 8KV 80mA
UP-7851	T500	3790167	1	FBTF T-3790167 HV-DD
UP-7851	VR500	4160667	1	TPOT GF06P 20KOHM
UP-7851	VR501	4160658	1	TPOT GF06P 500 OHM
UP-7851	VR720	4160685	1	TPOT GF06P 100KOHM
UP-7851	VR721	4160613	1	TPOT GF06P 10KOHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-76351 ECG/CPU BD				
UP-76351	CNJ100	5427663	1	PCN M60-12-30-114P STRAIGHT
UP-76351	CNJ101	5445474	1	PCN 1L-2P-S3FP2-1
UP-76351	CNJ105	5427672	1	PCN M60-15-30-114P STRAIGHT
UP-76351	CNJ106	5427173	1	PCN HIF3F-40PADSA 40P
UP-76351	CNJ108	5425139	1	PCN HKP-22MS-11BT
UP-76351	CNJ110	5427663	1	PCN M60-12-30-114P STRAIGHT
UP-76351	CNJ157	5427743	1	PCN HIF3F-34PA-2.54DSA
UP-76351	CNJ303	5427672	1	PCN M60-15-30-114P STRAIGHT
UP-76351	CNJ355	5427636	1	PCN M60-03-30-114P STRAIGHT
UP-76351	C100	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-76351	C103-C109	4317525	7	CEC1 TP D55Y5V1H 104Z 5-W
UP-76351	C111	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-76351	C112	3820768	1	FLC1 454M6302 104K
UP-76351	C113	4317525	1	CEC1 TP D55Y5V1H 104Z 5-W
UP-76351	C120	3800469	1	EC04 ECEA1HS010 50V1uF
UP-76351	C121	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-76351	C122	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-76351	C123	3800469	1	EC04 ECEA1HS010 50V1uF
UP-76351	C124	4315082	1	FLC1 ECQ-B 1H 222JZ3 0.0022uF
UP-76351	C125-C126	3839793	2	FLC1 ECQ-V1H224JZ 0.22uF
UP-76351	C127	3800469	1	EC04 ECEA1HS010 50V1uF
UP-76351	C128	4315206	1	FLC1 ECQ-B 1H 223JZ3 0.022uF
UP-76351	C129	4317623	1	CEC2 DD05-989B 331K500 (330pF)
UP-76351	C130	4317614	1	CEC2 DD05-989B 221K500 (220pF)
UP-76351	C151	3851066	1	CEC2 DD05SL220K500 500V22pF
UP-76351	C152	3890353	1	ECR-GA035M11-35pF
UP-76351	C153	3839837	1	FLC1 ECQ-V1H474JZ 0.47uF
UP-76351	C201-C206	4315304	6	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-76351	C207-C210	4315162	4	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-76351	C211-C220	4315304	10	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-76351	C230	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-76351	C231	3839525	1	FLC1 ECQ-B1H102JZ 0.001uF
UP-76351	C232	3800371	1	EC04 ECEA1VS100 35V10uF
UP-76351	C233	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-76351	C234	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-76351	C241-C242	4315046	2	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-76351	C243	3800371	1	EC04 ECEA1VS100 35V10uF
UP-76351	C250-C251	3839873	2	FLC1 ECQ-V1H105JZ 1.0uF
UP-76351	C252	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-76351	C253	4317641	1	CEC2 DD06-999B 681K500 (680pF)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-76351	C254	3824461	1	MPC ECQ-V1H 154JZ 50V 0.15uF
UP-76351	C255	4315304	1	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-76351	C256	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-76351	C257-C270	4315304	14	FLC1 ECQ-V 1H 104JZ3 (0.1uF)
UP-76351	C271-C272	3800219	2	EC04 ECEA1CS470 16V47uF
UP-76351	C273	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-76351	C274	3839793	1	FLC1 ECQ-V1H224JZ 0.22uF
UP-76351	C275	4315269	1	FLC1 ECQ-V 1H 473JZ3 (0.047uF)
UP-76351	C301-C304	4315046	4	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-76351	C305	3839819	1	FLC1 ECQ-V1H334JZ 0.33uF
UP-76351	C306	4315162	1	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-76351	C307	3800371	1	EC04 ECEA1VS100 35V10uF
UP-76351	C309-C310	3800371	2	EC04 ECEA1VS100 35V10uF
UP-76351	C311	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-76351	C312	4315287	1	FLC1 ECQ-V 1H 683JZ3 (0.068uF)
UP-76351	C351-C352	4315162	2	FLC1 ECQ-B 1H 103JZ3 0.01uF
UP-76351	C353	3839873	1	FLC1 ECQ-V1H105JZ 1.0uF
UP-76351	C354	4315046	1	FLC1 ECQ-B 1H 102JZ3 0.001uF
UP-76351	C355-C356	3800371	2	EC04 ECEA1VS100 35V10uF
UP-76351	C401	4317614	1	CEC2 DD05-989B 221K500 (220pF)
UP-76351	C402-C407	4317525	6	CEC1 TP D55Y5V1H 104Z 5-W
UP-76351	DA101	0950571	1	D MA430
UP-76351	DA102	0800582	1	D Diode Array DAN 401
UP-76351	DA103	0800573	1	D Diode Array DAP 401
UP-76351	DA104	0800582	1	D Diode Array DAN 401
UP-76351	DA105	0800573	1	D Diode Array DAP 401
UP-76351	DA231	0800573	1	D Diode Array DAP 401
UP-76351	DA232	0800582	1	D Diode Array DAN 401
UP-76351	DA233	0800573	1	D Diode Array DAP 401
UP-76351	D100-D106	4322528	7	D 1S2076ARE
UP-76351	D151-D153	4322528	3	D 1S2076ARE
UP-76351	D201-D216	0800564	16	D 1SS237
UP-76351	D217-D218	4322528	2	D 1S2076ARE
UP-76351	D219	0800564	1	D 1SS237
UP-76351	D220-D225	4322528	6	D 1S2076ARE
UP-76351	D230-D231	4322528	2	D 1S2076ARE
UP-76351	D232	0800092	1	D 0A91(1S1005)
UP-76351	D241-D242	4322528	2	D 1S2076ARE
UP-76351	D253-D259	4322528	7	D 1S2076ARE
UP-76351	D301-D302	4322528	2	D 1S2076ARE
UP-76351	D303-D304	4327612	2	ZD2 HZ9C1RE (8.9-9.3V)
UP-76351	D305-D314	0800644	10	D 1SV126
UP-76351	D351-D354	4322528	4	D 1S2076ARE

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-76351	D355-D356	4327612	2	ZD2 HZ9C1RE (8.9-9.3V)
UP-76351	D357-D358	4322528	2	D 1S2076ARE
UP-76351	D401	4322528	1	D 1S2076ARE
UP-76351	GA351	2100335	1	GA B1C90 (90V)
UP-76351	ICS103	5422846	1	SOKT IC SOCKET DL-2-28A (01)
UP-76351	ICS107	5601279	1	SOKT 208-93-764 64PIC SOCKET
UP-76351	ICS201	5601279	1	SOKT 208-93-764 64PIC SOCKET
UP-76351	ICS203	5422846	1	SOKT IC SOCKET DL-2-28A (01)
UP-76351	ICS405	5601279	1	SOKT 208-93-764 64PIC SOCKET
UP-76351	IC101	1205786	1	CPU uPD71055C(82C55A-2)
UP-76351	IC102	1302859	1	CPU uPD8279C-2
UP-76351	IC104	1302984	1	MIC uPD74HC138C(HD74HC138P)
UP-76351	IC105	1253403	1	AIC TL7700C
UP-76351	IC106	1303528	1	MIC uPD74HC123C(HD74HC123P)
UP-76351	IC107	1205768	1	CPU HD63B03XP
UP-76351	IC108	1303074	1	MIC uPD74HC4040C(HD74HC4040P)
UP-76351	IC109	1302948	1	MIC uPD74HC08C(HD74HC08P)
UP-76351	IC110	1302975	1	MIC HD74HC32P(uPD74HC32C)
UP-76351	IC112	1203752	1	TIC SN74LS365
UP-76351	IC114	1252752	1	OPIC HA17082PS 2FET
UP-76351	IC115	1302948	1	MIC uPD74HC08C(HD74HC08P)
UP-76351	IC116	1302912	1	MIC HD74HC00P(uPD74HC00C)
UP-76351	IC151	1303662	1	CPU MSM6242 RS
UP-76351	IC201	1205768	1	CPU HD63B03XP
UP-76351	IC202	1253501	1	ADIC uPD-7004C8CH10BITA/D
UP-76351	IC204	1206473	1	CPU MB84256-10LP-G
UP-76351	IC205	1303065	1	MIC HD74HC245P(uPD74HC245C)
UP-76351	IC206-IC207	1303056	2	MIC HD74HC244P(uPD74HC244C)
UP-76351	IC208	1302912	1	MIC HD74HC00P(uPD74HC00C)
UP-76351	IC209	1302939	1	MIC HD74HC04P(uPD74HC04C)
UP-76351	IC230	1300629	1	MIC HD14052BP(MC14052BCP)
UP-76351	IC250	1300629	1	MIC HD14052BP(MC14052BCP)
UP-76351	IC251	1601875	1	MD NP2014B
UP-76351	IC252	1300611	1	MIC HD14051BP(MC14051BCP)
UP-76351	IC253	1300638	1	MIC HD14053BP(MC14053BCP)
UP-76351	IC254-IC255	1253118	2	OPIC uPC324C QUAD
UP-76351	IC256	1253715	1	OPIC uPC812C(LF412CN)2FET
UP-76351	IC257	1300638	1	MIC HD14053BP(MC14053BCP)
UP-76351	IC258	1252084	1	OPIC TL072CP
UP-76351	IC301-IC302	1252084	2	OPIC TL072CP
UP-76351	IC303-IC305	1300611	3	MIC HD14051BP(MC14051BCP)
UP-76351	IC306	1253724	1	OPIC uPC4570C
UP-76351	IC307	1251165	1	OPIC uPC1458C

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION	
UP-76351	IC308	1251904	1	AIC	MB4204 (uPC339C)
UP-76351	IC309	1300629	1	MIC	HD14052BP (MC14052BCP)
UP-76351	IC351	1252084	1	OPIC	TL072CP
UP-76351	IC352	1300629	1	MIC	HD14052BP (MC14052BCP)
UP-76351	IC401-IC402	1303056	2	MIC	HD74HC244P (uPD74HC244C)
UP-76351	IC403	1303065	1	MIC	HD74HC245P (uPD74HC245C)
UP-76351	IC404	1204902	1	CPU	HM6264LP-15 (uPD4364C-15L)
UP-76351	IC406	1251174	1	ADIC	uPC624C (DAC-08CQ)
UP-76351	IC408	1300522	1	MIC	HD14042BP (MC14042BCP)
UP-76351	IC409	1303546	1	MIC	HD74HC151P (uPD74HC151C)
UP-76351	IC410	1303074	1	MIC	uPD74HC4040C (HD74HC4040P)
UP-76351	IC411	1302921	1	MIC	uPD74HC02C (HD74HC02P)
UP-76351	IC412	1303412	1	MIC	SN74HC03N (uPD74HC03C)
UP-76351	PC301	0600254	1	TRP	PC837
UP-76351	PC302	1704345	1	TRP	PC817 PHOTOCOUPLER
UP-76351	Q230-Q231	4335069	2	TRC	2SC1213AKDTZ
UP-76351	Q240-Q241	4335069	2	TRC	2SC1213AKDTZ
UP-76351	Q250	4330038	1	TRA	2SA495GTM-Y,TPE2
UP-76351	Q251	4335069	1	TRC	2SC1213AKDTZ
UP-76351	RA100	4090582	1	RM	EXB-P84-103J
UP-76351	RA101	4090813	1	RM	EXB-P88-103J
UP-76351	RA102-RA103	4090582	2	RM	EXB-P84-103J
UP-76351	RA104	4090813	1	RM	EXB-P88-103J
UP-76351	RA105-RA106	4091153	2	RM	EXB-T44-101J
UP-76351	RA201-RA202	4092624	2	RM	EXB-T44-472J 4.7 KOHM
UP-76351	RA203	4090822	1	RM	EXB-P88-472J
UP-76351	RA204	4090787	1	RM	EXB-P88-104J
UP-76351	RA206	4090813	1	RM	EXB-P88-103J
UP-76351	RA230	4091884	1	RM	EXB-P84-472J
UP-76351	RA301	4093338	1	RM	CMR-042B 20.0K OHM
UP-76351	RA302	4093347	1	RM	CMR-042A 30.1K OHM
UP-76351	RA303	4090689	1	RM	EXB-P84-473J
UP-76351	RA304	4093356	1	RM	EXB-F8V-154J
UP-76351	RA305-RA306	4091572	2	RM	EXB-T44-103J
UP-76351	RA401	4090813	1	RM	EXB-P88-103J
UP-76351	SW100	3352168	1	SW	DSS 104
UP-76351	SW102	3350838	1	DSW	DSS102
UP-76351	T301	3772285	1	PLTF	EP17 50KHZ SIG Yellow
UP-76351	T302	3772267	1	PLTF	EP17 50KHZ DC-DC Red
UP-76351	T351	3772258	1	PLTF	EP13 50KHZ SIG Yellow
UP-76351	T352	3772276	1	PLTF	EP13 50KHZ DC-DC Red
UP-76351	VR101	4160685	1	TPOT	GF06P 100KOHM
UP-76351	VR251	4160596	1	TPOT	GF06P 1KOHM

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
UP-76351	VR252	4160667	1	TPOT GF06P 20KOHM
UP-76351	VR253	4160827	1	TPOT GF06P 500KOHM
UP-76351	VR254	4160667	1	TPOT GF06P 20KOHM
UP-76351	VR255	4160604	1	TPOT GF06P 5KOHM
UP-76351	X100	1750927	1	XTAL TD308C(XC0-B)8MHZ
UP-76351	X151	1702597	1	XTAL KF38G 32.768KHZ
UP-76351	ZD250	1253519	1	REG LT1009CZ 2.5VREF
UP-76351	ZD251	1090329	1	ZD2 HZ6C1 6V

UP-76391 VR AND CONNECTOR BD

UP-76391		5350531	1	CCN2 HR16-17RA-6S 6P FEMALE
UP-76391	CNP303	5427966	1	PCN CABLE TEC ECG M62-15

UP-76392 VR AND CONNECTOR BD

UP-76392		5395108	1	CCN2 XZ-123R (8S)
UP-76392	CNP303	5427966	1	PCN CABLE TEC ECG M62-15

UP-76393 VR AND CONNECTOR BD

UP-76393		5395108	1	CCN2 XZ-123R (8S)
UP-76393	CNP303	5427966	1	PCN CABLE TEC ECG M62-15

UP-76396 VR AND CONNECTOR BD

UP-76396		5395108	1	CCN2 XZ-123R (8S)
UP-76396	CNP303	5427966	1	PCN CABLE TEC ECG M62-15

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

UP-76397 VR AND CONNECTOR BD

UP-76397		5395108	1	CCN2 XZ-123R (8S)
UP-76397	CNP303	5427966	1	PCN CABLE TEC ECG M62-15

UP-76398 VR AND CONNECTOR BD

UP-76398		5395108	1	CCN2 XZ-123R (8S)
UP-76398	CNP303	5427966	1	PCN CABLE TEC ECG M62-15

WS-701X RECORDER CHASSIS PARTS

WS-701X		0600236	1	TRP NJL5142EL-A
WS-701X		1800063	1	HEAD EUX-C18A8HC01
WS-701X		3280111	2	SW SS-5GL2
WS-701X		4700593	1	SP EFB-VH36A Piezo speaker
WS-701X		4790673	1	TD MAGNETIC SENSOR FP-2R-02
WS-701X		4810447	1	DCMO EN35-H107N1B (24V)
WS-701X		5424024	1	NCN 171825-2 Receptacle Male
WS-701X	CNP700	5427511	1	PCN M62-15-3034SA (30)
WS-701X	CNP710	5552697	1	PCN HKP20FS02-10BT(15)

WS-702X RECORDER CHASSIS PARTS

WS-702X		0600236	1	TRP NJL5142EL-A
WS-702X		1800063	1	HEAD EUX-C18A8HC01
WS-702X		3280111	2	SW SS-5GL2
WS-702X		4700593	1	SP EFB-VH36A Piezo speaker
WS-702X		4810447	1	DCMO EN35-H107N1B (24V)
WS-702X		5424024	1	NCN 171825-2 Receptacle Male
WS-702X	CNP617	5427306	1	PCN M62-03-3036SA (10)
WS-702X	CNP700	5427511	1	PCN M62-15-3034SA (30)

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
WS-702X	CNP710	5552697	1	PCN HKP20FS02-10BT(15)
WS-702X		4740986	1	TD ROTARY ENCODER 200P/R

YZ-000G8 CHASSIS PARTS-2

YZ-000G8		3853331	1	C	HV Capacitor IA5040AD
YZ-000G8		4840343	1	FAM0	MD516B-12-Q2

YZ-001G0 CHASSIS PARTS-2

YZ-001G0		4840343	1	FAM0	MD516B-12-Q2
YZ-001G0	C550	3853429	1	C	HV Capacitor NKC5040A

YZ-001G1 CHASSIS PARTS-2

YZ-001G1		3853429	1	C	HV Capacitor NKC5040A
YZ-001G1		4840343	1	FAM0	MD516B-12-Q2

YZ-001G2 CHASSIS PARTS-2

YZ-001G2	C550	3853429	1	C	HV Capacitor NKC5040A
----------	------	---------	---	---	-----------------------

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

YZ-001G3 CHASSIS PARTS-2

YZ-001G3		4840343	1	FAMO MD516B-12-Q2
YZ-001G3	C550	3853429	1	C HV Capacitor NKC5040A

YZ-001G4 CHASSIS PARTS-2

YZ-001G4		3853331	1	C HV Capacitor IA5040AD
YZ-001G4		4840343	1	FAMO MD516B-12-Q2

YZ-001G5 CHASSIS PARTS-2

YZ-001G5		3853429	1	C HV Capacitor NKC5040A
YZ-001G5		4840343	1	FAMO MD516B-12-Q2

YZ-001G6 CHASSIS PARTS-2

YZ-001G6		4840343	1	FAMO MD516B-12-Q2
YZ-001G6	C550	3853429	1	C HV Capacitor NKC5040A

YZ-001G8 CHASSIS PARTS-2

YZ-001G8		4840343	1	FAMO MD516B-12-Q2
YZ-001G8	C550	3853429	1	C HV Capacitor NKC5040A

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
YZ-002G1 CHASSIS PARTS-2				
YZ-002G1		3853331	1	C HV Capacitor IA5040AD
YZ-002G1		4840343	1	FAMO MD516B-12-Q2
YZ-002G1		5501084	1	CORD V1.25-4 (250) Black
YZ-002G1	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G1	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G1	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

YZ-002G3 CHASSIS PARTS-2				
YZ-002G3		4840343	1	FAMO MD516B-12-Q2
YZ-002G3	C550	3853429	1	C HV Capacitor NKC5040A
YZ-002G3		5501084	1	CORD V1.25-4 (250) Black
YZ-002G3	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G3	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G3	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

YZ-002G4 CHASSIS PARTS-2				
YZ-002G4		5501084	1	CORD V1.25-4 (250) Black
YZ-002G4	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G4	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G4	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

YZ-002G5 CHASSIS PARTS-2				
YZ-002G5	C550	3853429	1	C HV Capacitor NKC5040A
YZ-002G5		5501084	1	CORD V1.25-4 (250) Black
YZ-002G5	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G5	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G5	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
------	---------	----------	------	-------------

YZ-002G6 CHASSIS PARTS-2

YZ-002G6		4840343	1	FAMO MD516B-12-Q2
YZ-002G6	C550	3853429	1	C HV Capacitor NKC5040A
YZ-002G6		5501084	1	CORD V1.25-4 (250) Black
YZ-002G6	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G6	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G6	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

YZ-002G7 CHASSIS PARTS-2

YZ-002G7		3853331	1	C HV Capacitor IA5040AD
YZ-002G7		4840343	1	FAMO MD516B-12-Q2
YZ-002G7		5501084	1	CORD V1.25-4 (250) Black
YZ-002G7	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G7	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G7	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

YZ-002G8 CHASSIS PARTS-2

YZ-002G8		4840343	1	FAMO MD516B-12-Q2
YZ-002G8	C550	3853429	1	C HV Capacitor NKC5040A
YZ-002G8		5501084	1	CORD V1.25-4 (250) Black
YZ-002G8	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G8	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G8	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

ASSY	CKT NO.	PART NO.	Q'TY	DESCRIPTION
YZ-002G9 CHASSIS PARTS-2				
YZ-002G9		3853429	1	C HV Capacitor NKC5040A
YZ-002G9		4840343	1	FAMO MD516B-12-Q2
YZ-002G9		5501084	1	CORD V1.25-4 (250) Black
YZ-002G9	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-002G9	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-002G9	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

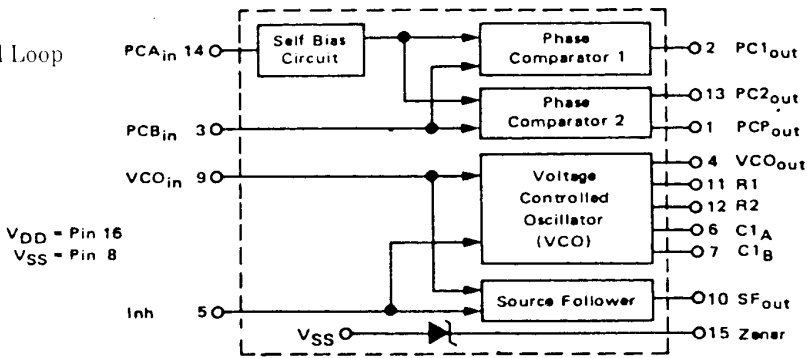
YZ-003G1 CHASSIS PARTS-2				
YZ-003G1		4840343	1	FAMO MD516B-12-Q2
YZ-003G1	C550	3853429	1	C HV Capacitor NKC5040A
YZ-003G1		5501084	1	CORD V1.25-4 (250) Black
YZ-003G1	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-003G1	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-003G1	CNP552	5500851	1	CORD HV Cable 201328-1(210) White

YZ-003G4 CHASSIS PARTS-2				
YZ-003G4		3853429	1	C HV Capacitor NKC5040A
YZ-003G4		4840343	1	FAMO MD516B-12-Q2
YZ-003G4		5501084	1	CORD V1.25-4 (250) Black
YZ-003G4	CNP057	5500958	1	CORD 350037-2 with HKP(13)
YZ-003G4	CNP551	5500824	1	CORD HV Cable 201328-1(210) Red
YZ-003G4	CNP552	5500851	1	CORD HV cable 201328-1(210) White

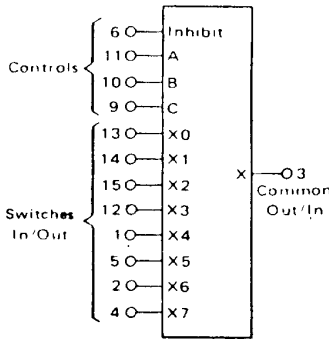
Section 9 IC DATA

CD4046BE	9.1	NJL5142EL-A	9.7
CD4051BE	9.1	NP2014B	9.7
CD4052BE	9.1	PC827	9.7
CD4053BE	9.1	PC817	9.7
HA17082PS	9.2	PC837	9.7
HA17723	9.2	SN74HC03N	9.7
HA17741PS	9.2	SN74LS07	9.7
HA178M05	9.2	SN74LS365	9.8
HA17806P	9.2	SWC-01	9.8
HA17812P	9.2	TL072CP	9.9
HD14042BP	9.2	TL494CN	9.9
HD14538BP	9.3	TL7700C	9.9
HD63B03XP	9.3	μPA2004C-10	9.9
HD637B01X0	9.15	μPC1458C	9.10
HD74HC00P	9.4	μPC324C	9.10
HD74HC04P	9.4	μPC358C	9.10
HD74HC151P	9.4	μPC393C	9.10
HD74HC244P	9.4	μPC4570C	9.10
HD74HC245P	9.5	μPC624C	9.10
HD74HC32P	9.5	μPC811C	9.11
HM6264LP-15	9.5	μPC812C	9.11
MB4204	9.6	μPD7004C	9.11
MC14001BCP	9.6	μPD71055C	9.12
MC14001UBCP	9.6	μPD74HC08C	9.12
MC14011BCP	9.6	μPD74HC123C	9.12
MC78L05CP	9.6	μPD74HC138C	9.13
MC7906CT	9.6	μPD74HC4040	9.13
MSM6242RS	9.6	μPD8279C-2	9.14

CD4046BE
Phase-Locked Loop

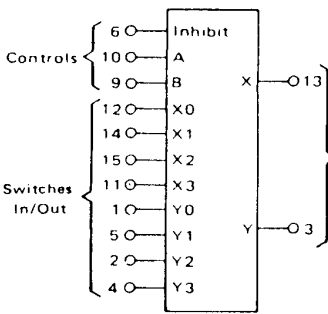


CD4051BE
8-Channel Analog
Multiplexer / Demultiplexer



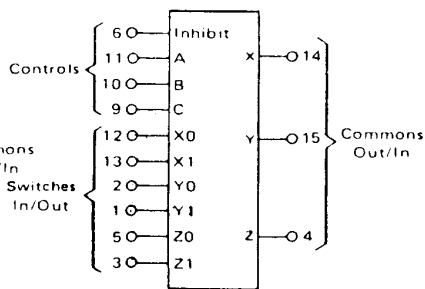
VDD = Pin 16
VSS = Pin 8
VEE = Pin 7

CD4052BE
4-Channel Analog
Multiplexer / Demultiplexer



VDD = Pin 16
VSS = Pin 8
VEE = Pin 7

CD4053BE
2-Channel Analog
Multiplexer / Demultiplexer



VDD = Pin 16
VSS = Pin 8
VEE = Pin 7

Note: Control Inputs referenced to VSS. Analog Inputs and Outputs reference to VEE. VEE must be $\leq$ VSS.

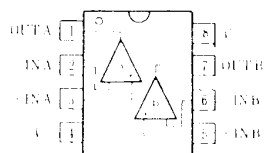
TRUTH TABLE

Control Inputs				ON Switches					
Inhibit	Select								
	C*	B	A	MC14051B	MC14052B	MC14053B			
0	0	0	0	X0	Y0	X0	Z0	Y0	X0
0	0	0	1	X1	Y1	X1	Z0	Y0	X1
0	0	1	0	X2	Y2	X2	Z0	Y1	X0
0	0	1	1	X3	Y3	X3	Z0	Y1	X1
0	1	0	0	X4			Z1	Y0	X0
0	1	0	1	X5			Z1	Y0	X1
0	1	1	0	X6			Z1	Y1	X0
0	1	1	1	X7			Z1	Y1	X1
1	x	x	x	None	None	None			

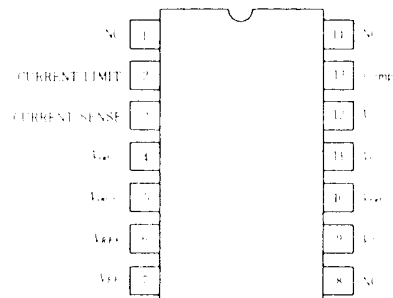
*Not applicable for MC14052
x = Don't Care

9. IC DATA

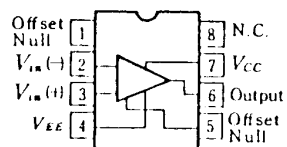
HA17082PS OP-Amp



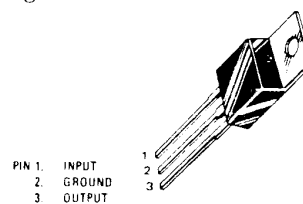
HA17723 Voltage Regulator



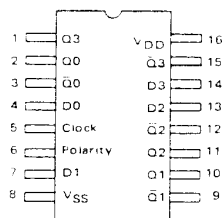
HA17741PS OP-AMP



HA178M05 HA17806P HA17812P Voltage Regulator



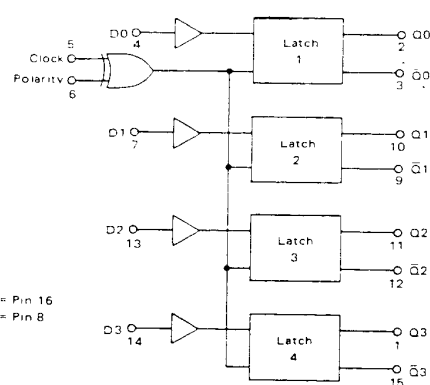
HD14042BP Latch



TRUTH TABLE

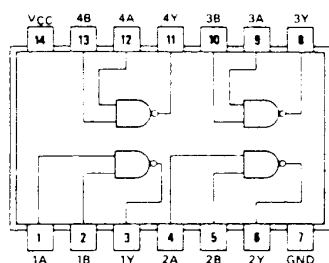
CLOCK	POLARITY	Q
0	0	Data
1	0	Latch
1	1	Data
1	1	Latch

LOGIC DIAGRAM

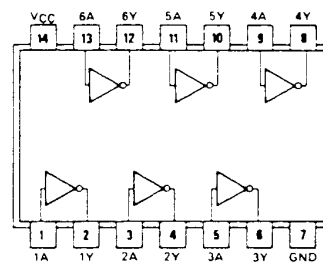


9. IC DATA

HD74HC00P
2-Input NAND Gates



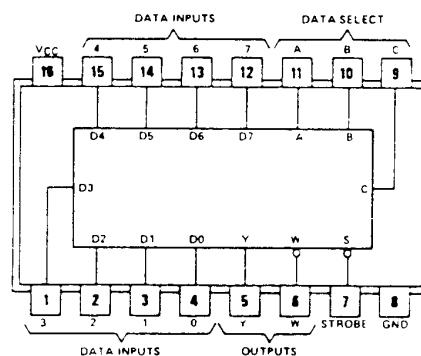
HD74HC04P
Inverters



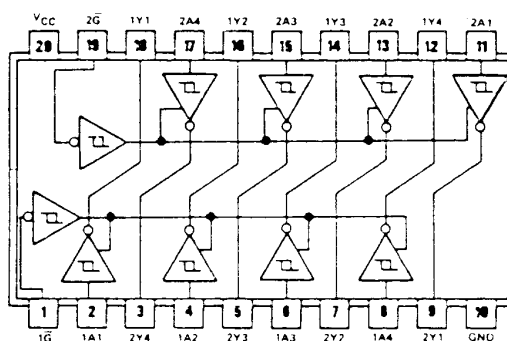
HD74HC151P
Multiplexers

FUNCTION TABLE				
INPUTS				OUTPUTS
SELECT			STROBE S	Y W
C	B	A		
X	X	X	H	L H
L	L	L	L	D0 $\overline{D0}$
L	L	H	L	D1 $\overline{D1}$
L	H	L	L	D2 $\overline{D2}$
L	H	H	L	D3 $\overline{D3}$
H	L	L	L	D4 $\overline{D4}$
H	L	H	L	D5 $\overline{D5}$
H	H	L	L	D6 $\overline{D6}$
H	H	H	L	D7 $\overline{D7}$

H = high level, L = low level, X = irrelevant



HD74HC244P
Buffers / Line Drivers /
Line Receivers

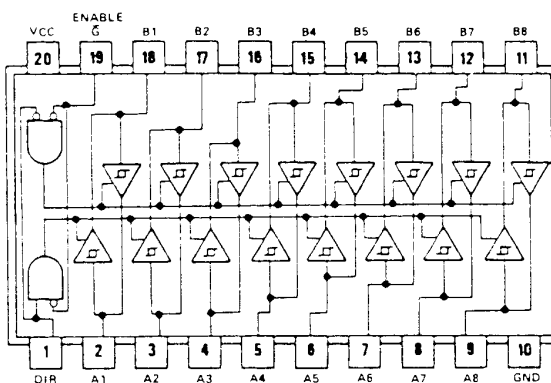


HD74HC245P Bus Transceivers

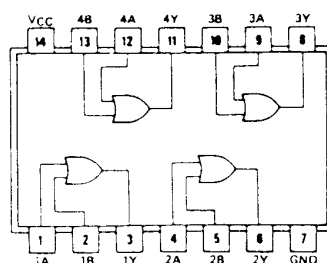
FUNCTION TABLE

ENABLE $\bar{G}$	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

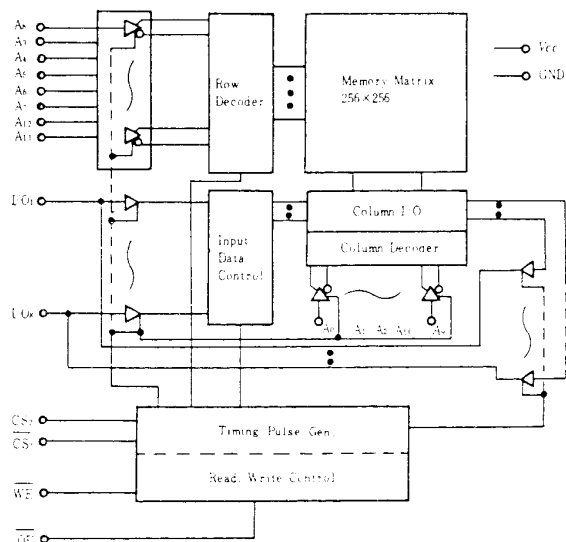
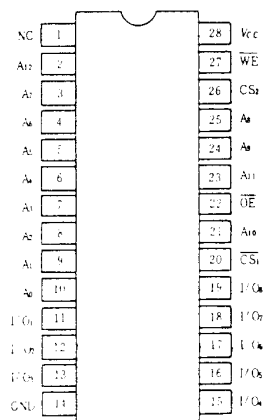
H = high level, L = low level, X = irrelevant



HD74HC32P 2-Input OR Gates



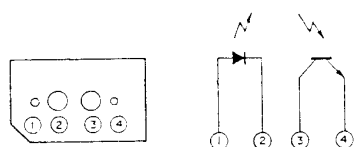
HM6264LP-15 8192-word × 8-Bit RAM



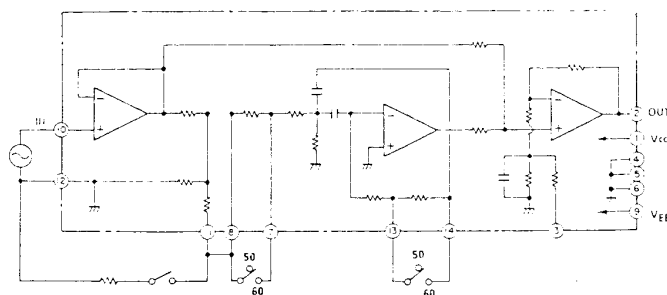
9.6

TEC-7100/7200.01

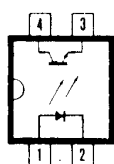
NJL5142EL-A
Photo Reflector



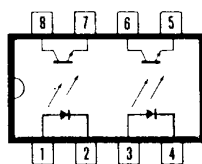
NP2014B
50/60 Notch Filter



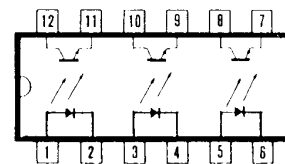
PC-827
Photocoupler



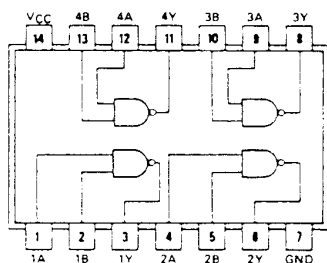
PC817
Photocoupler



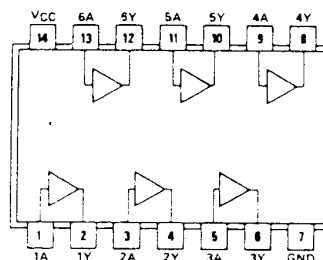
PC837
Photocoupler



SN74HC03N
2-Input NAND Gates

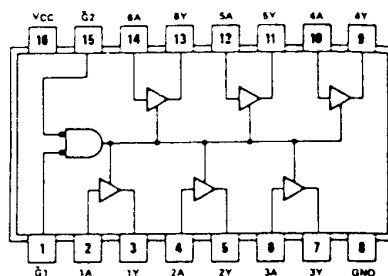


SN74LS07
Buffers / Drivers



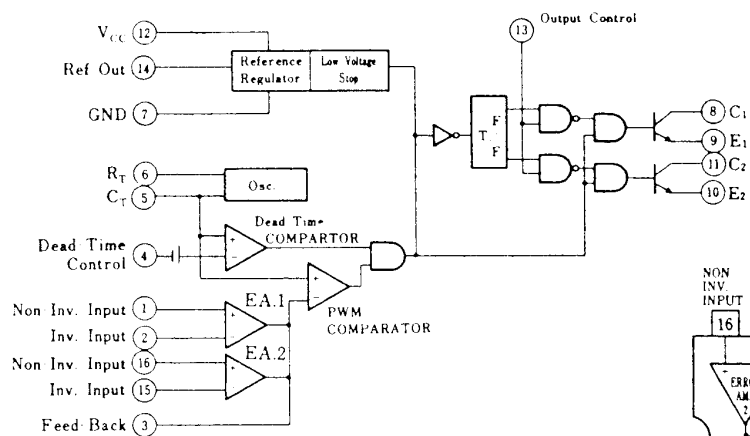
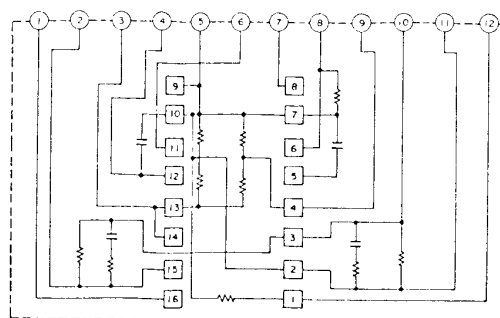
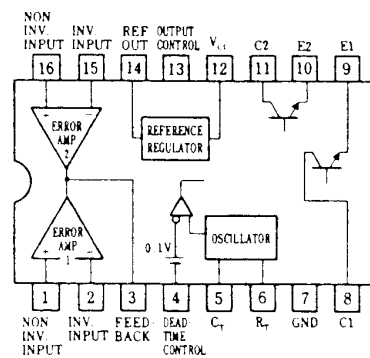
SN74LS365

Bus Drivers

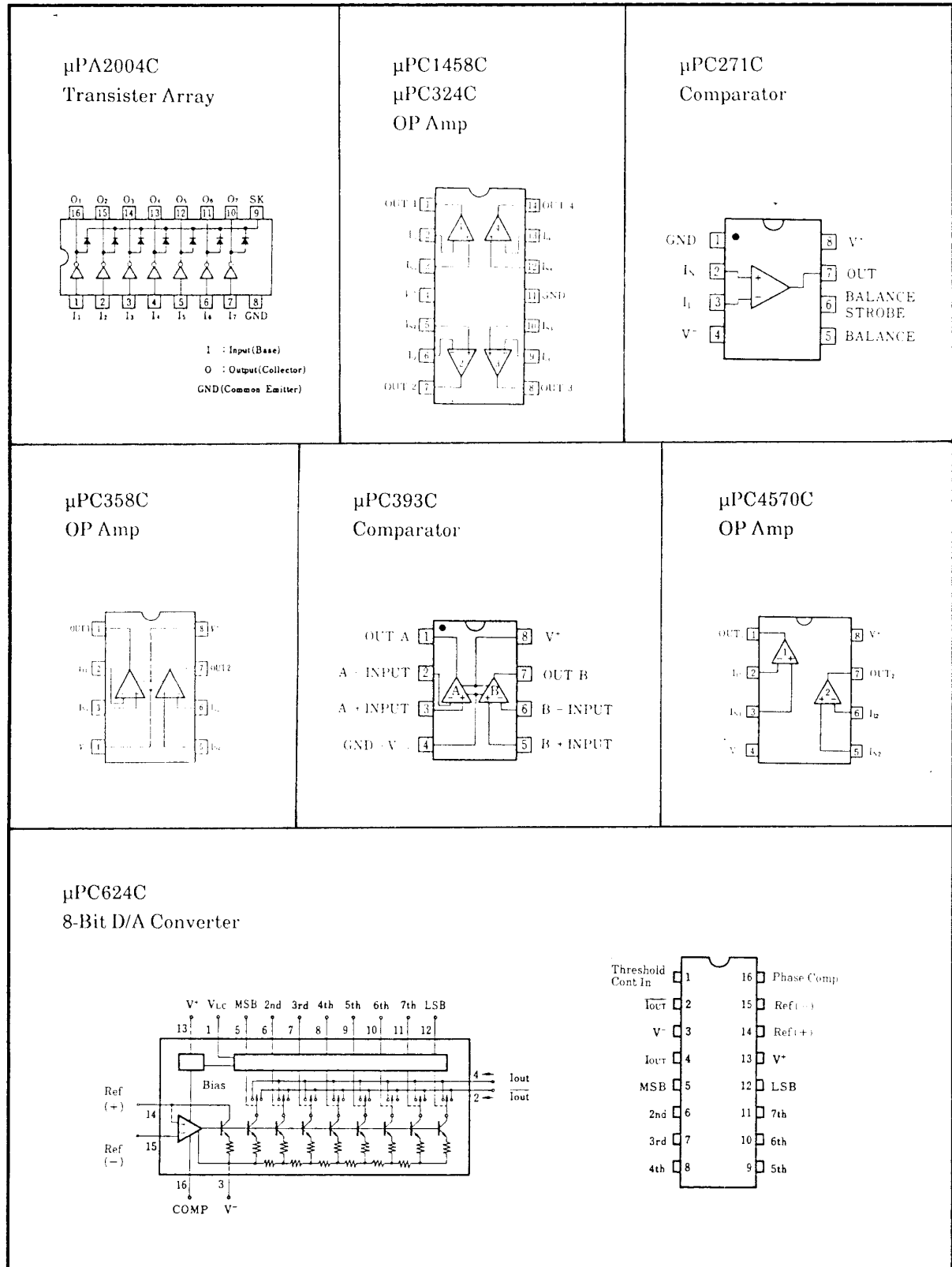


SWC-01

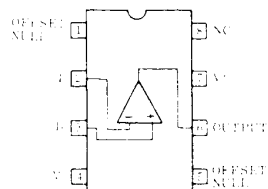
Switching Regulator Controller

 μPC494G is connected to 1 ~ 16.Block diagram of μPC494G .

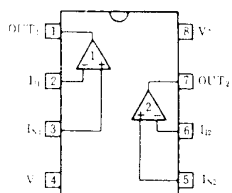
9. IC DATA



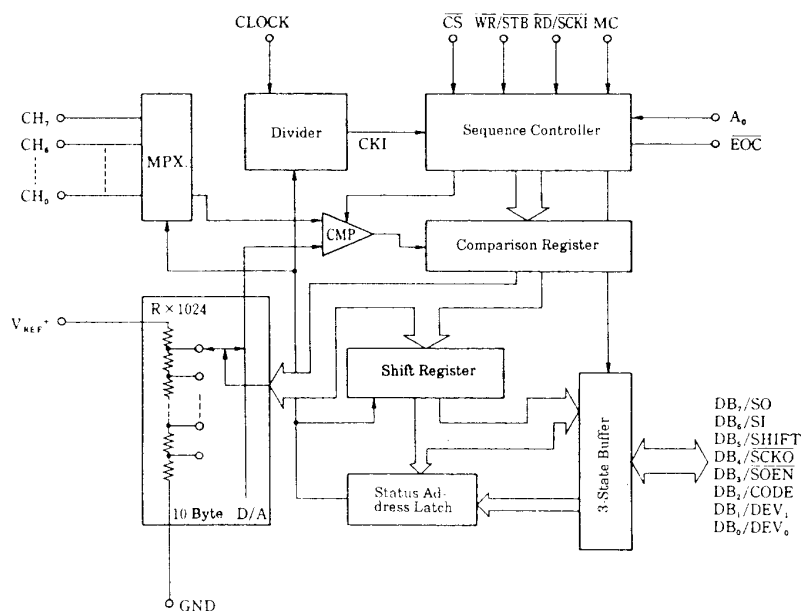
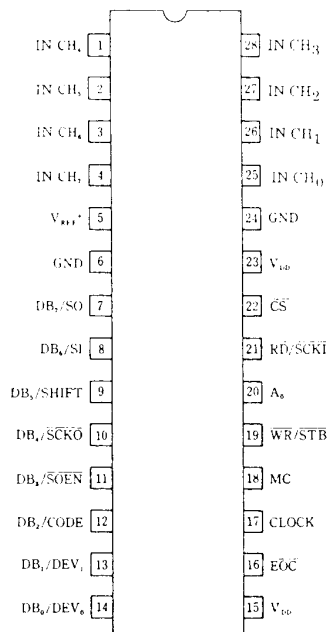
μ PC811C
OP Amp



μ PC812C
OP Amp



μ PD-7004C
10-Bit A/D Converter



μ PD71055C

Programmable
Peripheral Interface

8255A

POWER SUPPLIES: +5V, GND

BI-DIRECTIONAL DATA BUS: D7-D0

RD, WR, A1, A0, RESET

GROUP A CONTROL, GROUP B CONTROL, GROUP C UPPER (4), GROUP C LOWER (4), GROUP A PORT A (8), GROUP B PORT B (8), GROUP C PORT C UPPER (4), GROUP C PORT C LOWER (4)

I/O PA7-PA0, I/O PC7-PC4, I/O PC3-PC0, I/O PB7-PB0

μ PD74HC08C

2-Input AND Gates

μ PD74HC123C

Retriggerable
Monostable
Multivibrator

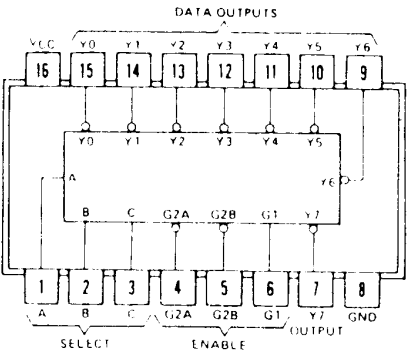
INPUTS			OUTPUTS	
CLEAR	A	B	Q	$\bar{Q}$
L	X	X	L	H
X	H	X	L	H
X	X	L	L	H
H	L	↑	↓	↑
H	↓	H	↓	↑
↑	L	H	↓	↑

μPD74HC138C
Decoders / Demultiplexer

LS138, S138
FUNCTION TABLE

ENABLE		SELECT			OUTPUTS							
G1	G2*	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	H	X	X	X	H	H	H	H	H	H	H	H
L	X	X	X	X	H	H	H	H	H	H	H	H
H	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	H	H	H	H	L	H	H	H	H	H
H	L	H	L	L	H	H	H	L	H	H	H	H
H	L	H	L	H	H	H	H	H	L	H	H	H
H	L	H	H	L	H	H	H	H	H	L	H	H
H	L	H	H	H	H	H	H	H	H	H	L	H
H	L	L	H	H	H	H	H	H	H	H	H	L

*G2 = G2A + G2B
H = high-level, L = low-level, X = irrelevant

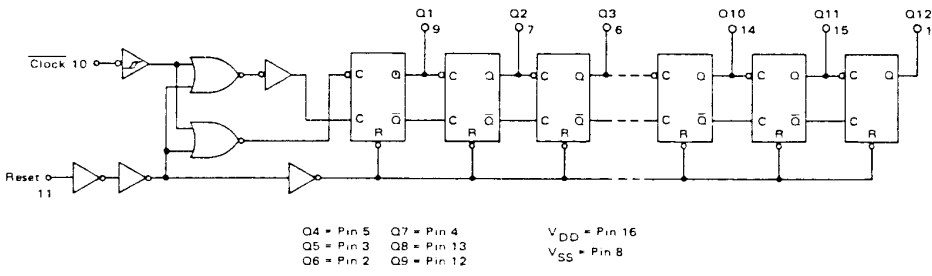


μPD74HC4040C
12-Bit Binary Counter

TRUTH TABLE

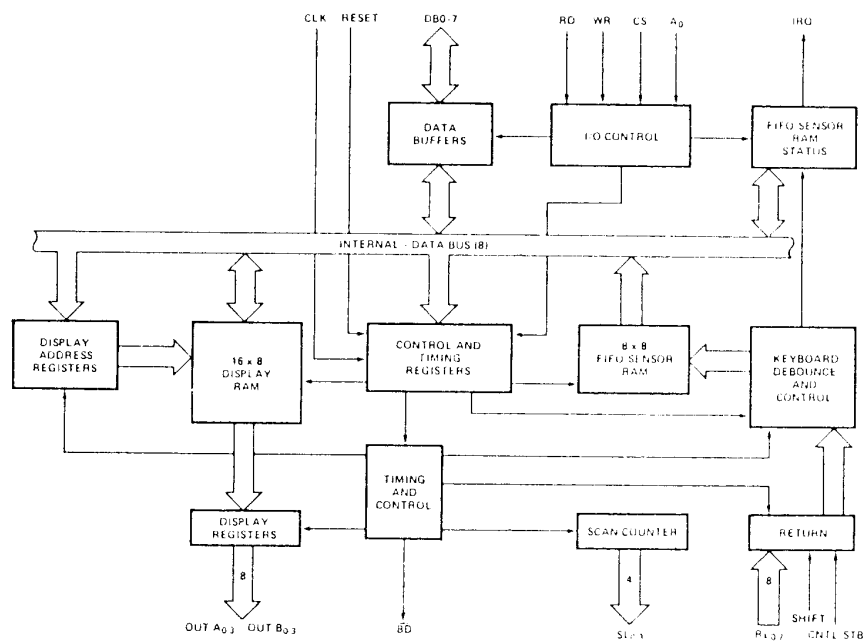
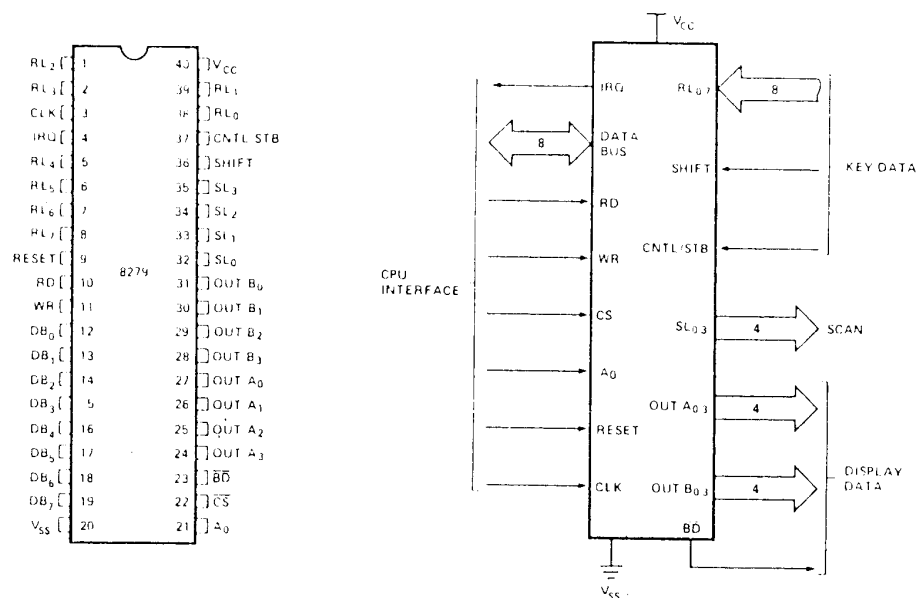
CLOCK	RESET	OUTPUT STATE
	0	No Change
	0	Advance to next state
X	1	All Outputs are low

X = Don't Care

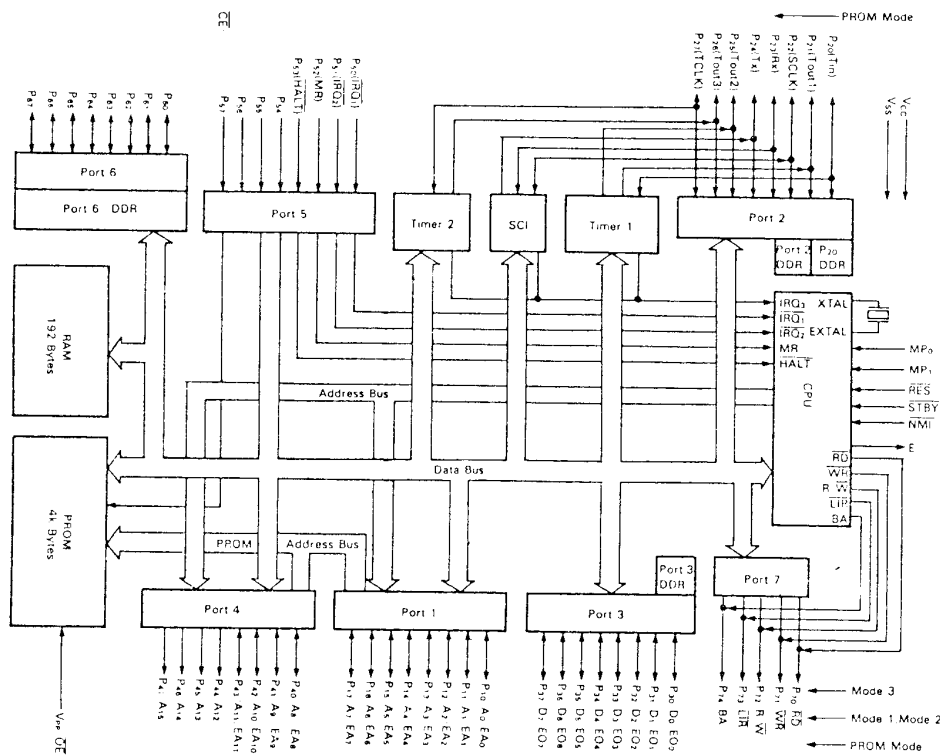
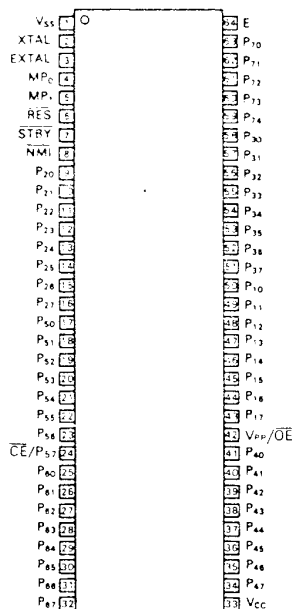


Q4 = Pin 5 Q7 = Pin 4 V_{DD} = Pin 16
Q5 = Pin 3 Q8 = Pin 13 V_{SS} = Pin 8
Q6 = Pin 2 Q9 = Pin 12

μPD8279C-2
Programmable Keyboard / Interface



HD637B01X0 CPU



Section 10 SIGNAL ABBREVIATION LIST

* : Used within one PCB

Symbol	Function
AC	AC power detection
ADCLK*	Clock pulse for A/D convertor
ART	Artifact (leads off) signal for telemeter
AUX	Auxiliary input
A0 ~ A15*	Address
BA*	Bus available
BACK UP*	Back up power supply of lithium battery
BAT +	Battery terminal, positive
BAT -	Battery terminal, negative
BATTCHG	"BATT CHG" (battery charging) LED control
BATTOFF	Battery power off
BELLADJ	Beep volume control out
BELLIN	Beep volume control in
BELLOUT	Beep out
BLANK	Blanking pulse for CRT
BRIGHT	Sync spot display control
BUCONT*	Battery back up control for host CPU RAM and ECG CPU RAM
C	Chest lead ECG
CAL *	Calibration control
CALDISP *	Calibration display control
CALL	Nurse call signal from transmitter
CHANNEL AD	Voltage corresponding to channel being received via optional receiver
CHGAD	Charged voltage for A/D conversion
CHGLED	Charge LED display control
CHGON	Energy charge control
CH1 /CH2	CH1 / CH2 trace selection
CLK	Clock signal for serial communication with optional unit
CNTL	CAL key entry
CSAD *	Chip select for A/D converter
CSCRT *	Chip select for CRT RAM and gate control for CRT CPU data bus buffer
CSECG *	Chip select for ECG RAM and direction control for ECG CPU data bus buffer
CSRAM	Chip select for host CPU RAM

10. SIGNAL ABBREVIATION LIST

* : Used within one PCB

Symbol	Function
CSRAM-A	Chip select for ECG CPU RAM
DCHGCHK	Discharge check
DIP0	Time constant selection (ECG / MON)
DIP1	AC filter on / off
DIP2	Alarm recording on / off
DIP3	Auto recording on / off
DIP4	Paper sensitivity, high / low
DIP5	Lead all / P, I , II , III
DIP6	Recording mode, realtime / delay
DIP7	Paddle sync on / off
DISPSEL	Display mode select key
DISP0 ~ DISP2 *	LED display control
D0 ~ D7	Data bus
EA	Ground for analog circuits
ED	Ground for digital circuits
ER	Ground for recorder
EY	Ground for CRT
ECGOUT	ECG signal for A/D conversion in optional unit
ECHG	Ground for + 12 V
ENB	Recording enable
ENRGADJ	Energy adjustment voltage
ESEL0 ~ ESEL3	Energy selector switch position code
EOC *	End of A / D conversion
EXCHG	Charge signal form paddle
EXDISCHG	Discharge signal form paddle
EXIST	Not used
EXTRLY	External discharge relay control
EXTECG	External ECG output
FEEDA	Paper sensor, anode
FEEDC	Paper sensor, collector
FEEDE	Paper sensor, emitter
FEEDK	Paper sensor, cathode

10. SIGNAL ABBREVIATION LIST

* : Used within one PCB

Symbol	Function
GAIN0 ~ GAIN2 *	ECG gain control
HALTCRT	Halt signal for CRT CPU
HALTECG	Halt signal for ECG CPU
HSYNC	Synchronization signal for horizontal deflection
HUMFIL	AC filter control
INST *	INST (reset) control
INST-1*	INST control
INST-2	Not used
INTRLY	Internal discharge relay control
INTEN1 ~ INTEN3 *	Intensity control VR terminals
LA	ECG signal, left arm
LED +	Battery detection switch, common
LED -	Battery detection switch
LEDGR	Paddle LED control, green
LEDRED	Paddle LED control, red
LEDYEL	Paddle LED control, yellow
LFAULT	Lead fault (leads off)
LL	ECG signal, left leg
LOWCUT *	Low cut filter control
LURCOM	Thermal head detection switch, common
LURNO	Thermal head detection switch, normally open
MAKPLS	Not used
MOTOR1 ~ MOTOR2	Motor drive signal
NOPAPER	Thermal head and paper detection
OPTION*	Select signal of ECG from interface unit
OP.ECGx5	ECG signal (5mV/mV) from interface unit
OVERCHG	Overcharge detection
PADL1 ~ PADL2	Paddle type discrimination
PCREF *	Clock for paddle contact excitor, 50KHz
PCAD	Paddle contact signal for A / D conversion
PECGA	Paddle lead ECG, apex
PECGS	Paddle lead ECG, sternum

10. SIGNAL ABBREVIATION LIST

* : Used within one PCB

Symbol	Function
POWERON	Power on signal from energy selector
PRTCLK	Clock for recorder
RA	ECG signal, right arm
RCVFLT	Receiving fault
RD *	Read
REC	Recorder motor control
REF *	Reference voltage + 4 V
RL	ECG signal, right leg
RST *	Reset for all CPUs
RTC *	Realtime clock, 2 ms
R0 ~ R3	Return line from sheet key
RxD	Reception data for serial communication with optional unit
SEL0 ~ SEL4 *	Input selection control
SENSA	Paper sensor, anode
SENSC	Paper sensor, collector
SENSE	Paper sensor, emitter
SENSK	Paper sensor, cathode
SENSOUT	Rotation sensor output
SENS +	Rotation sensor, positive
SENS -	Rotation sensor, negative
SH	Shield for ECG signal
SIN	Recording data (Serial in)
SOUT	Recording data of the previous line to avoid successive printing (Serial out)
STB	Strobe signal for recorder
S0 ~ S3	Scan line for sheet key entry and LED display control
TCLK *	Clock for test waveform
TC 0.1*	Select signal of time constant of 0.1 sec
TELE	Telemetry signal receiving
TELEW	Telemetry waveform
TTROUT	Integrated value of change of discharge current (output of TTR measuring circuit)
TTRRST	Reset for TTR measuring circuit

10. SIGNAL ABBREVIATION LIST

* : Used within one PCB

Symbol	Function
TxD	Transmission data for serial communication with optional unit
VSYNC	Synchronization signal for vertical deflection
WAVE /CHR	Waveform / character selection control
WR *	Write
X1, X2	Horizontal deflection yoke signal
YSIG	Waveform signal for CRT
YP1, YP2	Vertical deflection position yoke signal
Y1, Y2	Vertical deflection yoke signal
ZBB	Transmitter battery level low signal
ZBECG +	Transmitter ECG signal
50KHz *	ECG floating clock
8MHzCLK	Clock for CPU
+ 5V	+ 5 V for digital circuits
– 6V	– 6 V for analog circuits
+ 6V	+ 6 V for analog circuits
– 8.5V	– 8.5V for CRT
+ 8.5V	+ 8.5V for CRT
+ 12VCHG	Unregulated + 12 V
+ 12V	+ 12 V for CRT
+ 12VREC	+ 12 V for recorder
+ 12VB	Unregulated + 12 V
12MHz CLK*	Clock of host CPU and ECG CPU
25/5 mm/s	Paper speed selection

Section 11

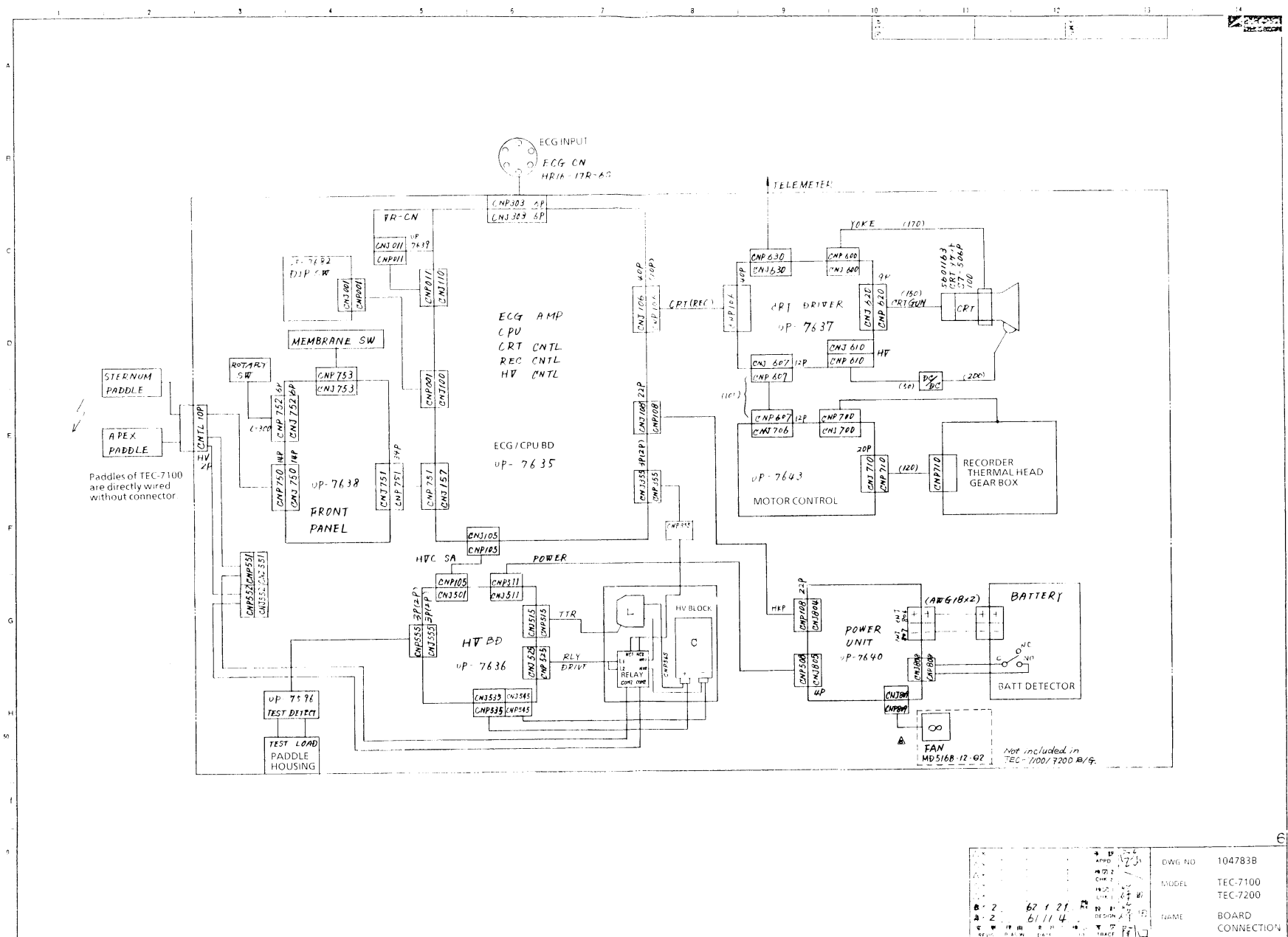
CIRCUITS DIAGRAMS & PARTS LOCATIONS

CONTENTS

		DWG NO.	PAGE
TEC-7100 TEC-7200	BOARD CONNECTION -----	104783	11.1
	CONNECTOR PIN ASSIGNMENT (1 / 3) -----	104711	11.3
	CONNECTOR PIN ASSIGNMENT (2 / 3) -----	104712	11.4
	CONNECTOR PIN ASSIGNMENT (3 / 3) -----	104713	11.5
TEC-7300	BOARD CONNECTION -----	105560	11.41
	CONNECTOR PIN ASSIGNMENT (1 / 3) -----	105556	11.43
	CONNECTOR PIN ASSIGNMENT (2 / 3) -----	105557	11.44
	CONNECTOR PIN ASSIGNMENT (3 / 3) -----	105558	11.45
TEC-7100 TEC-7200 TEC-7300	UP-76351 (7100) UP-7635 (7200)	ECG / CPU BD	
	ECG / CPU (1 / 5) MAIN -----	104628	11.7
	ECG / CPU (2 / 5) ECG 2 -----	104627	11.9
	ECG / CPU (3 / 5) ECG 1 -----	104626	11.11
	ECG / CPU (4 / 5) CRT -----	104629	11.13
	ECG / CPU (5 / 5) CONNECTOR -----	104640	11.15
	UP-7737 (7300)	ECG / CPU BD	
	ECG / CPU (1 / 5) MAIN -----	105526	11.47
	ECG / CPU (2 / 5) ECG 2 -----	105525	11.49
	ECG / CPU (3 / 5) ECG 1 -----	105524	11.51
	ECG / CPU (4 / 5) CRT -----	105527	11.53
	ECG / CPU (5 / 5) CONNECTOR -----	105528	11.55

UP-7851 (7100/7200/7300 G) UP-7636 (Others)	HIGH VOLTAGE BD	106732	11.59
		104630	11.17
UP-7850 (7300G)	RELAY BD	106732	11.59
UP-7596	TEST DETECT BD	104630	11.17
UP-7740	CRT DRIVER	105662	11.19
UP-7638	FRONT PANEL BD	104633	11.21
UP-7639#	VR AND CONNECTOR BD	104634	11.23
UP-7682	DIP SW BD	104634	11.23
WS-701V# (7100/7200) WS-702V# (7300)	RECORDER	104714	11.25
		105561	11.57
UP-7738	MOTOR CONTROL BD	105529	11.27
SC-701V#	POWER UNIT		
UP-7720 (TEC-7100/7200/7300 B, G) UP-7640 (Other models)	SW REGULATOR	105301	11.29
		104796	11.31
ND-701V# (7100) ND-702V# (7200/7300)	EXTERNAL PADDLE	104717	11.33
		104636	11.35
ND-723V ND-725V ND-727V	INTERNAL PADDLE	104637	11.37
ND-704V#	ANT-POST PADDLE	104638	11.39

Units with # mark differ according to the model.
See pages 1.7 and 1.8 for units with # mark.



TEC7100/7200/7300.01

CNJ 150 (CPU)	CNJ 303 (ECG AMP)	CNJ 511 (-V)	CNJ 355 (ECG AMP)	CNJ 600 (CRT)
HIF-3FB-34PA-2.54DS	M60-15-30-114	350543-1 (AMP)	M60-3-30-114	HKT-0H55-11
to CNP751 (FRONT PANEL)	to CNJ 003 (ECG CONNECTOR)	to CNJ 005 (POWER)	to CNJ 553 (HU UNIT)	to YOKE
HLF-23A-34D-B C(10)	HR16-17R-6S	350543-1 (AMP)	M60-3-30-114	
S0	1	2	51	
S2	3	4	S3	
R0	5	6	R1	
R2	7	8	R3	
ESEL-0	9	10	ESEL-1	
ESEL-2	11	12	ESEL-3	
DISP-0	13	14	DISP-1	
DISP-2	15	16	EX-CHG	
EX-DISCHG	17	18	LED-RED	
LED-YEL	19	20	LED-GR	
CHG-LED	21	22	PABL-1	
PABL-2	23	24	BELL OUT	
CNTL	25	26	BATTCHG	
EV	27	28	+5V	
EV	29	30	+5V	
112.00EP RN	31	32	+120B	
	33	34	---	

[illegible]

△	APD	104712
△	CHP 2	DWG HQ
△	CHP 2	TEC-7100
△	CHP 1	MODEL
△	DESIGN	TEC-7200
△		NAME
△		CONNECTOR
△		PIN ASSIGN-

1 2 3 4 5 6 7 8 9 10



CNJ 630 (CRT)
110-15-30-134
LO TELEMEETER

CNJ 100 (REC)
160-11-30-114
LO RECORDER

CNJ 710 (REC)
HKP-20MS10BT
TO

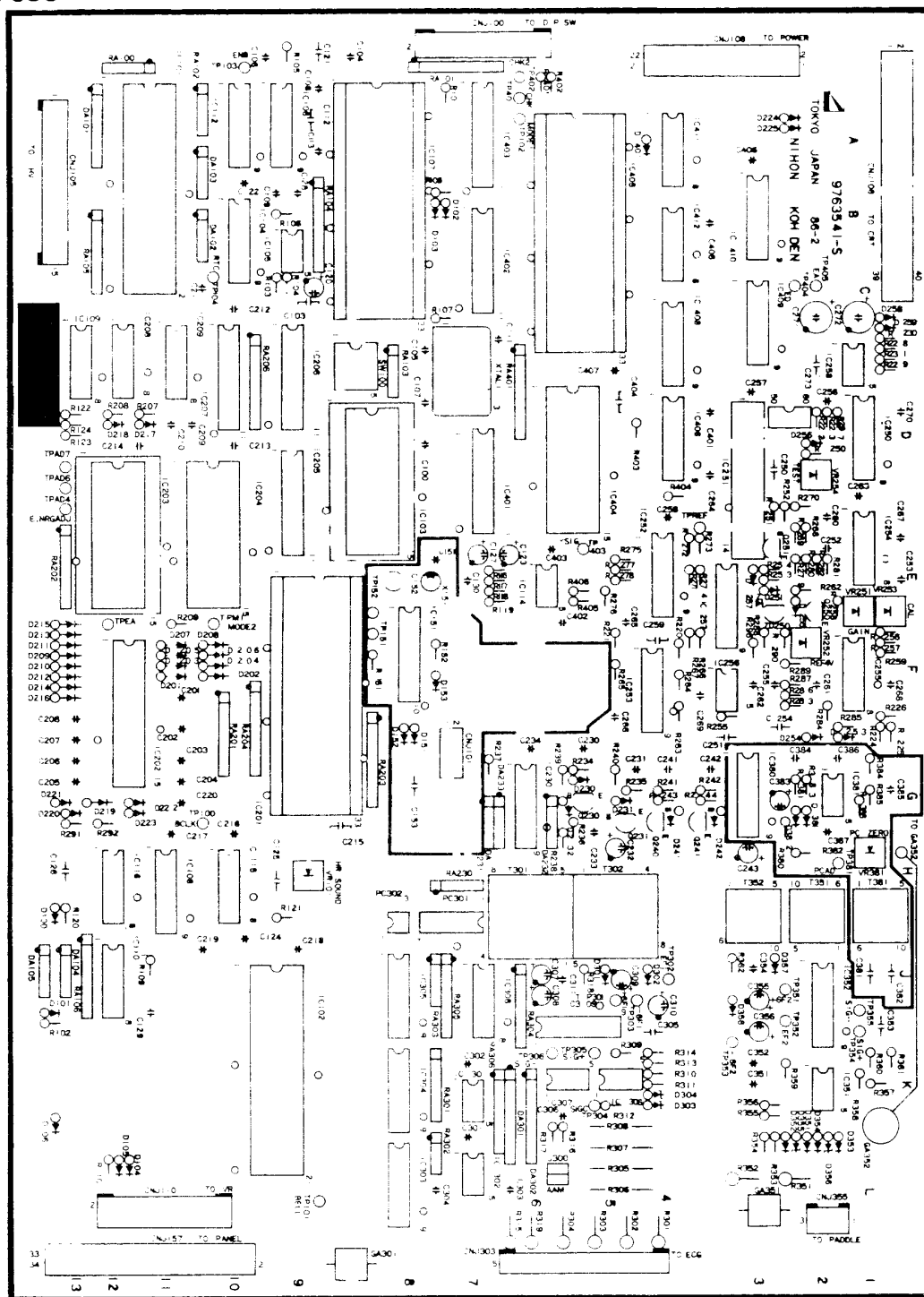
CNJ 750 (FRONT PANEL)
HKP-14MS-7BT
TO

CNJ 752 (ENERGY SELECTOR)
M11-11-10-114P
TO

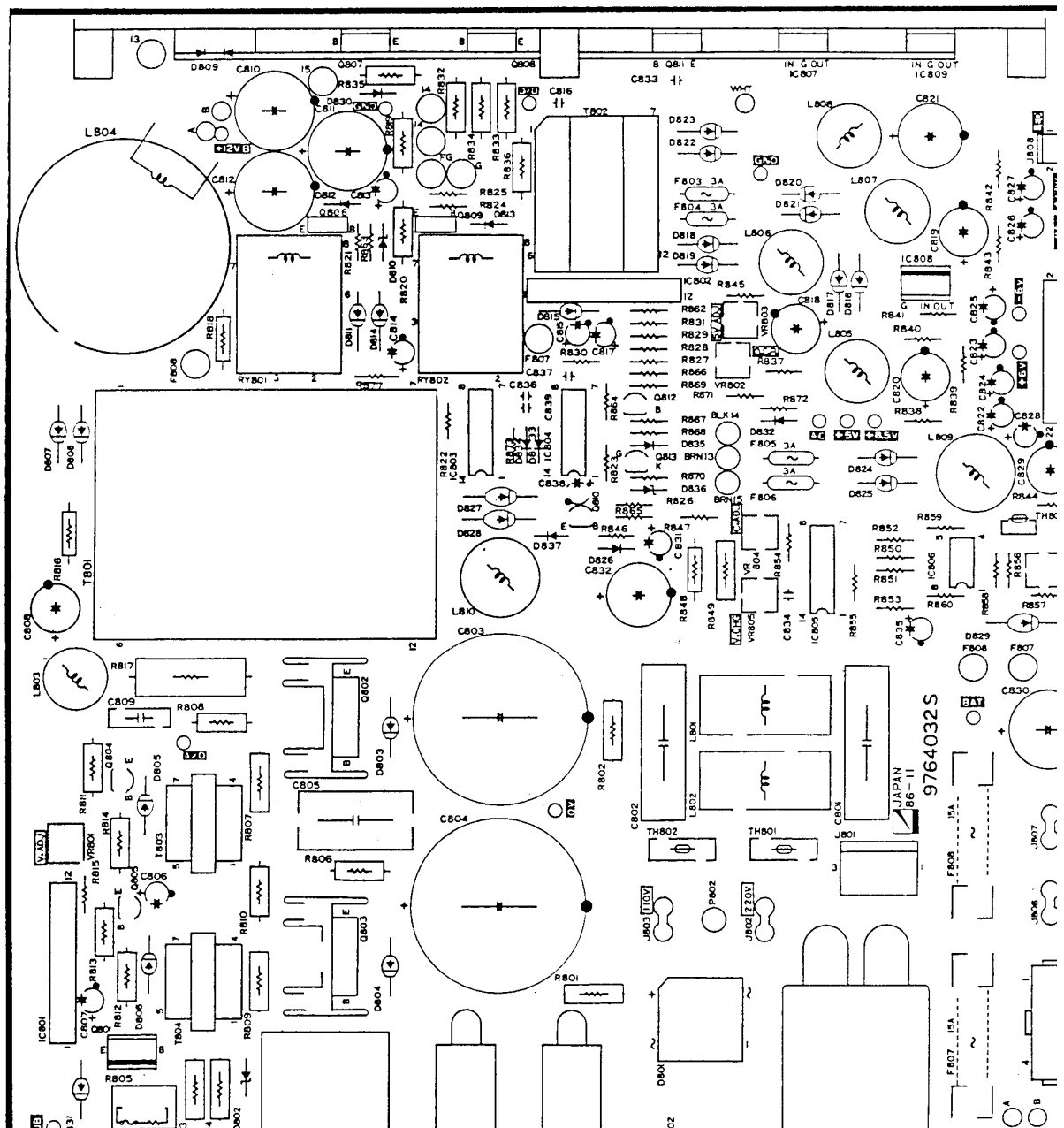
(THERMAL HEAD) TO CNJ 05' (PADDLE CONNECTOR)

	1	2				1	SENS. A	ER	1	2	ER		EX-CHG	1	2	PADL 2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
--	---	---	--	--	--	---	---------	----	---	---	----	--	--------	---	---	--------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

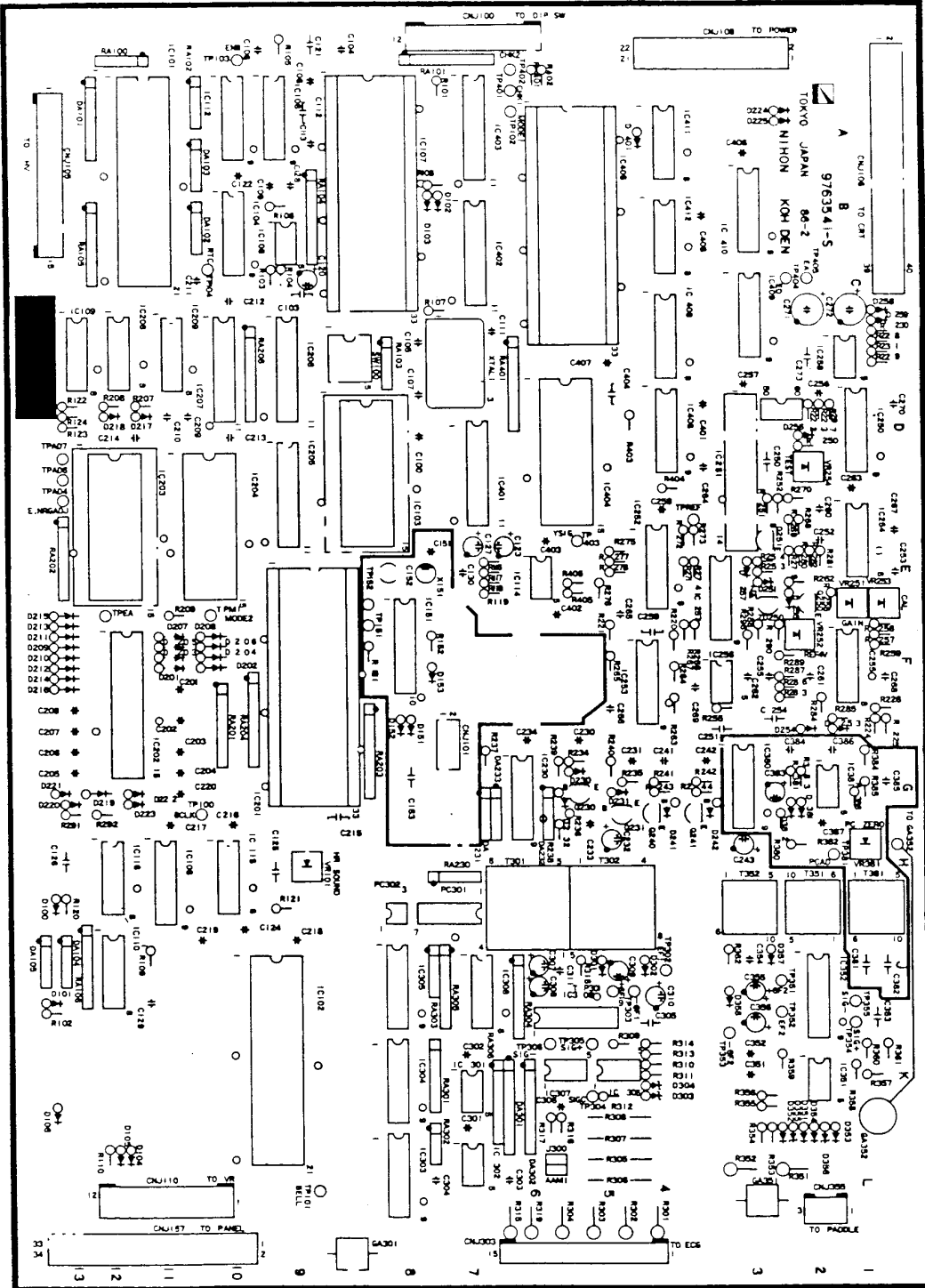
ECG / CPU BD
UP-76351
UP-7635



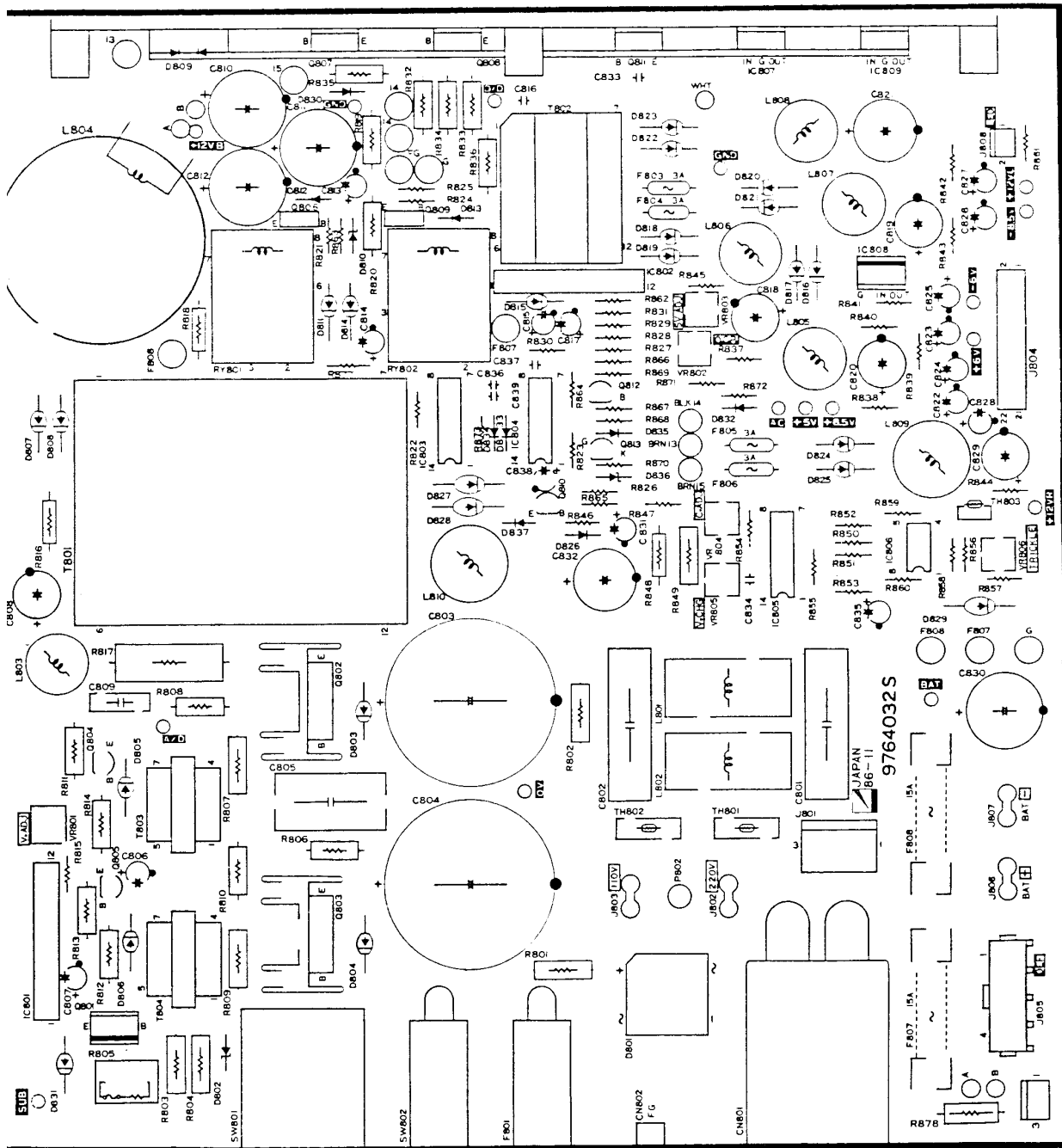
SW REGULATOR UP-7640

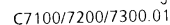


ECG / CPU BD
JP-76351
JP-7635

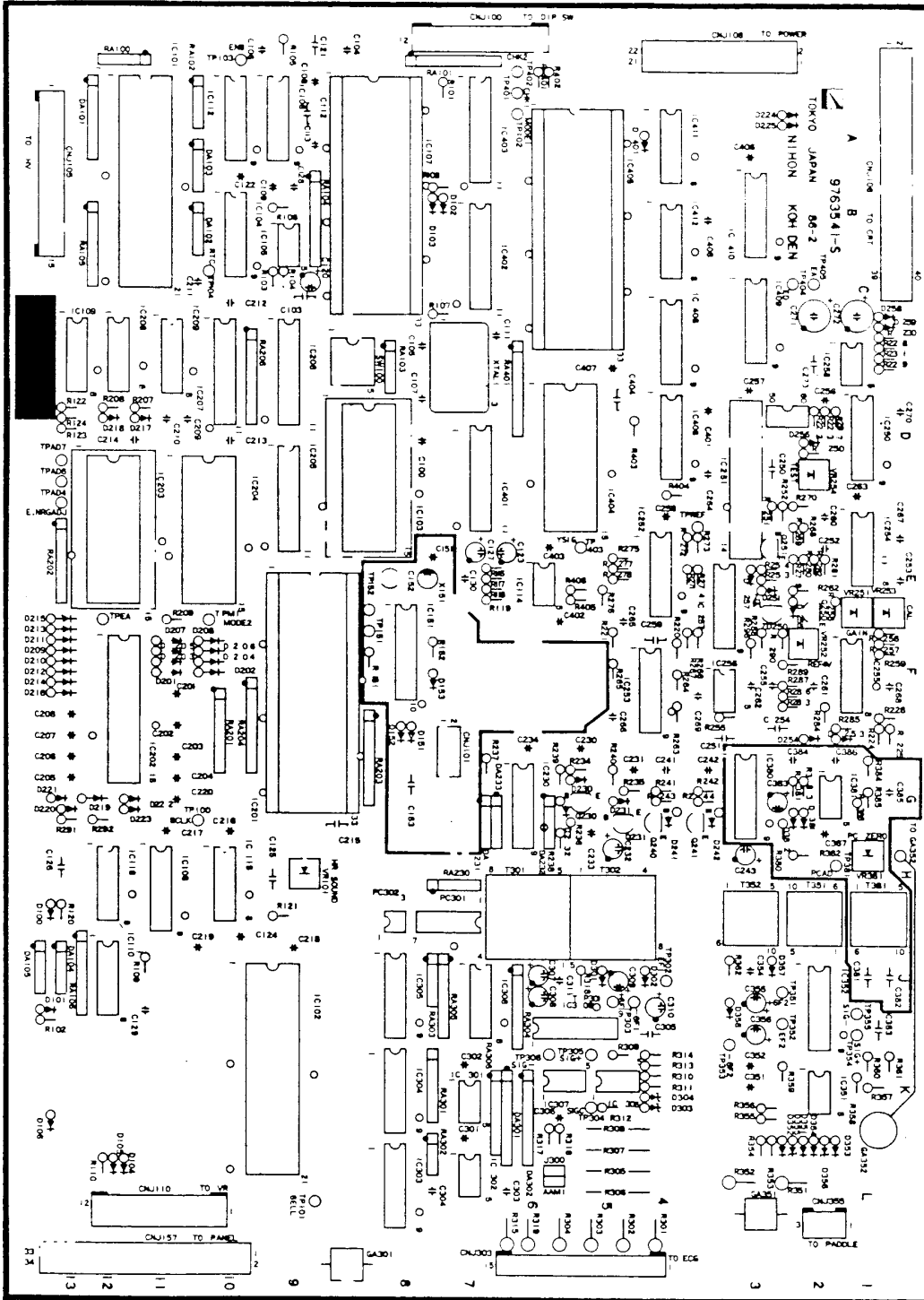


SW REGULATOR UP-7640

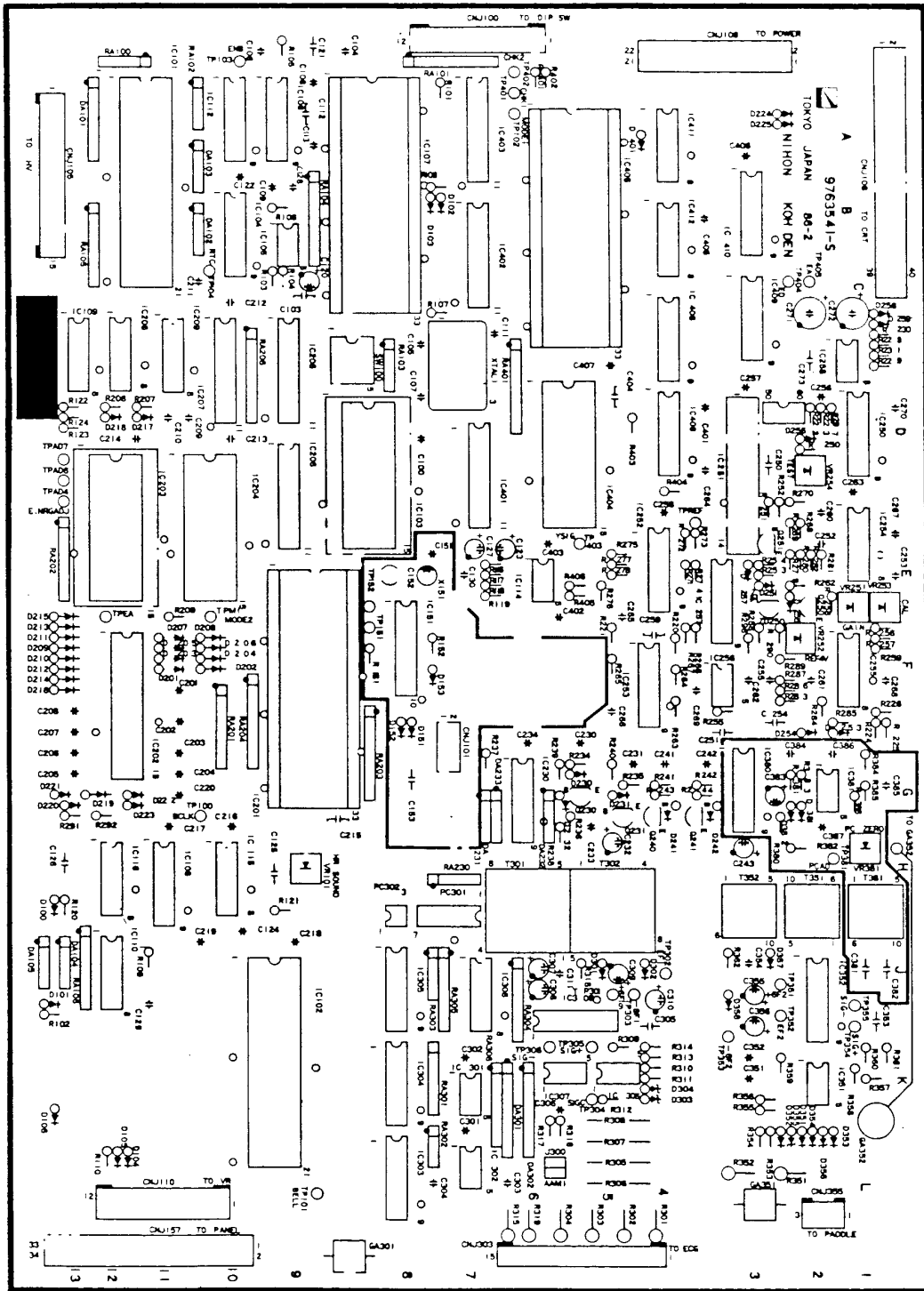


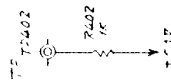
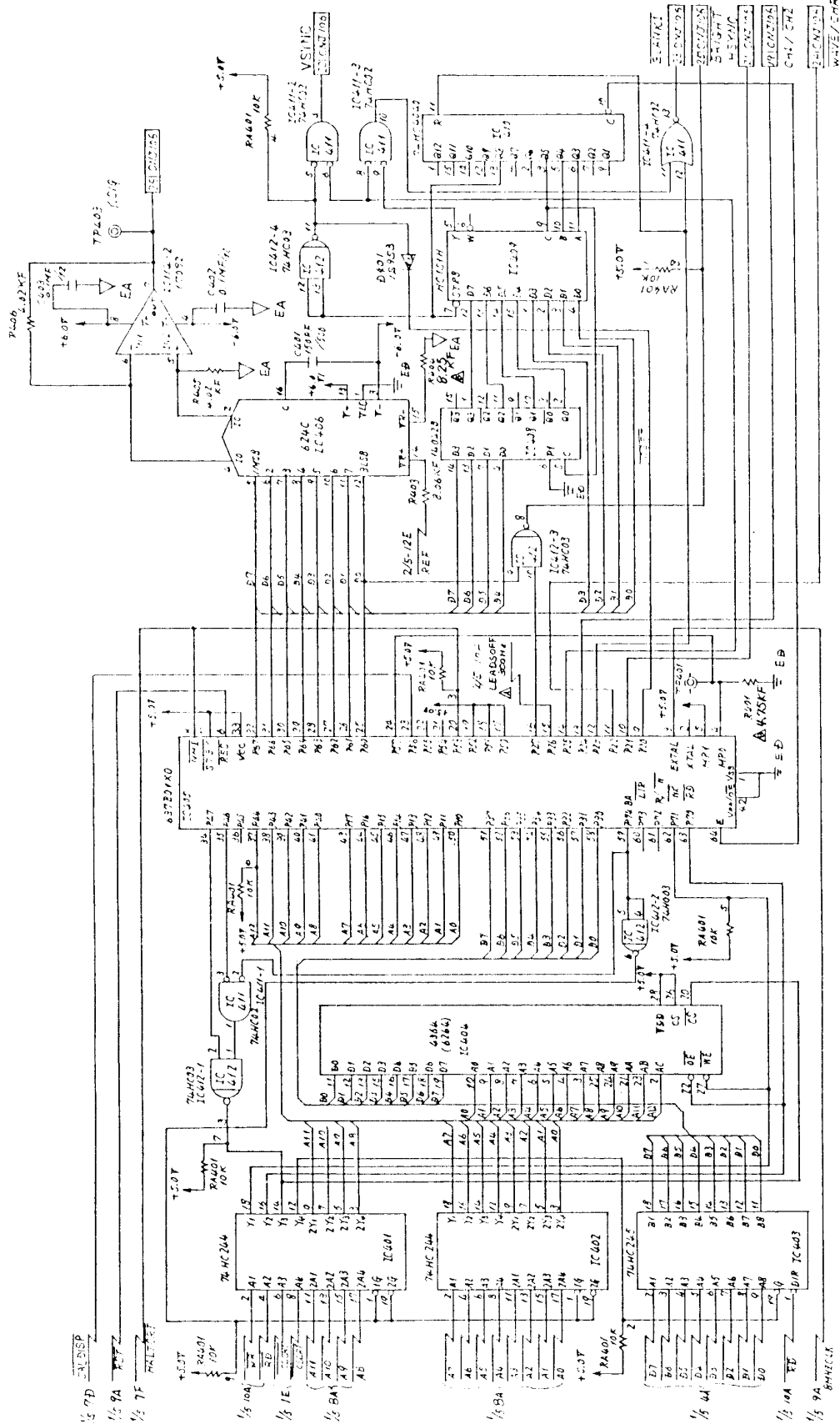


ECG / CPU BD
JP-76351
JP-7635



ECG / CPU BD
UP-76351
UP-7635





4/5

△ X	APPD	104629B
△ X	CHK 2	UP-7635
△ X	CHK 1	UP-76351
△ X	DESIGN	ECG/CPU BD
△ X	DATE	(4/5) CRT
△ X	REV	
△ X	DATE	
△ X	CHK	
△ X	TRACE	



9763657 HV

POWER

IC508

IC507

IC506

IC505

IC504

IC503

IC502

IC501

IC500

IC509

IC510

IC511

IC512

IC513

IC514

IC515

IC516

IC517

IC518

IC519

IC520

IC521

IC522

IC523

IC524

IC525

IC526

IC527

IC528

IC529

IC530

IC531

IC532

IC533

IC534

IC535

IC536

IC537

IC538

IC539

IC540

IC541

IC542

IC543

IC544

IC545

IC546

IC547

IC548

IC549

IC550

IC551

IC552

IC553

IC554

IC555

IC556

IC557

IC558

IC559

IC560

IC561

IC562

IC563

IC564

IC565

IC566

IC567

IC568

IC569

IC570

IC571

IC572

IC573

IC574

IC575

IC576

IC577

IC578

IC579

IC580

IC581

IC582

IC583

IC584

IC585

IC586

IC587

IC588

IC589

IC590

IC591

IC592

IC593

IC594

IC595

IC596

IC597

IC598

IC599

IC600

IC601

IC602

IC603

IC604

IC605

IC606

IC607

IC608

IC609

IC610

IC611

IC612

IC613

IC614

IC615

IC616

IC617

IC618

IC619

IC620

IC621

IC622

IC623

IC624

IC625

IC626

IC627

IC628

IC629

IC630

IC631

IC632

IC633

IC634

IC635

IC636

IC637

IC638

IC639

IC640

IC641

IC642

IC643

IC644

IC645

IC646

IC647

IC648

IC649

IC650

IC651

IC652

IC653

IC654

IC655

IC656

IC657

IC658

IC659

IC660

IC661

IC662

IC663

IC664

IC665

IC666

IC667

IC668

IC669

IC670

IC671

IC672

IC673

IC674

IC675

IC676

IC677

IC678

IC679

IC680

IC681

IC682

IC683

IC684

IC685

IC686

IC687

IC688

IC689

IC690

IC691

IC692

IC693

IC694

IC695

IC696

IC697

IC698

IC699

IC700

IC701

IC702

IC703

IC704

IC705

IC706

IC707

IC708

IC709

IC710

IC711

IC712

IC713

IC714

IC715

IC716

IC717

IC718

IC719

IC720

IC721

IC722

IC723

IC724

IC725

IC726

IC727

IC728

IC729

IC730

IC731

IC732

IC733

IC734

IC735

IC736

IC737

IC738

IC739

IC740

IC741

IC742

IC743

IC744

IC745

IC746

IC747

IC748

IC749

IC750

IC751

IC752

IC753

IC754

IC755

IC756

IC757

IC758

IC759

IC760

IC761

IC762

IC763

IC764

IC765

IC766

IC767

IC768

IC769

IC770

IC771

IC772

IC773

IC774

IC775

IC776

IC777

IC778

IC779

IC780

IC781

IC782

IC783

IC784

IC785

IC786

IC787

IC788

IC789

IC790

IC791

IC792

IC793

IC794

IC795

IC796

IC797

IC798

IC799

IC800

IC801

IC802

IC803

IC804

IC805

IC806

IC807

IC808

IC809

IC810

IC811

IC812

IC813

IC814

IC815

IC816

IC817

IC818

IC819

IC820

IC821

IC822

IC823

IC824

IC825

IC826

IC827

IC828

IC829

IC830

IC831

IC832

IC833

IC834

IC835

IC836

IC837

IC838

IC839

IC840

IC841

IC842

IC843

IC844

IC845

IC846

IC847

IC848

IC849

IC850

IC851

IC852

IC853

IC854

IC855

IC856

IC857

IC858

IC859

IC860

IC861

IC862

IC863

IC864

IC865

IC866

IC867

IC868

IC869

IC870

IC871

IC872

IC873

IC874

IC875

IC876

IC877

IC878

IC879

IC880

IC881

IC882

IC883

IC884

IC885

IC886

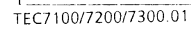
IC887

IC888

IC889

IC890

IC891



UP-7740

CRT 9774021-S
TOKYO JAPAN
NIHON KOHDEN 87-10

VR602
XP

C618
C619
C630
C631
C632
C633
C634
C635
C636
C637
C638
C639
C640
C641
C642
C643
C644
C645
C646
C647
C648
C649
C650
C651
C652
C653
C654
C655
C656
C657
C658
C659
C660
C661
C662
C663
C664
C665
C666
C667
C668
C669
C670
C671
C672
C673
C674
C675
C676
C677
C678
C679
C680
C681
C682
C683
C684
C685
C686
C687
C688
C689
C690
C691
C692
C693
C694
C695
C696
C697
C698
C699
C700
C701
C702
C703
C704
C705
C706
C707
C708
C709
C710
C711
C712
C713
C714
C715
C716
C717
C718
C719
C720
C721
C722
C723
C724
C725
C726
C727
C728
C729
C730
C731
C732
C733
C734
C735
C736
C737
C738
C739
C740
C741
C742
C743
C744
C745
C746
C747
C748
C749
C750
C751
C752
C753
C754
C755
C756
C757
C758
C759
C760
C761
C762
C763
C764
C765
C766
C767
C768
C769
C770
C771
C772
C773
C774
C775
C776
C777
C778
C779
C780
C781
C782
C783
C784
C785
C786
C787
C788
C789
C790
C791
C792
C793
C794
C795
C796
C797
C798
C799
C800
C801
C802
C803
C804
C805
C806
C807
C808
C809
C810
C811
C812
C813
C814
C815
C816
C817
C818
C819
C820
C821
C822
C823
C824
C825
C826
C827
C828
C829
C830
C831
C832
C833
C834
C835
C836
C837
C838
C839
C840
C841
C842
C843
C844
C845
C846
C847
C848
C849
C850
C851
C852
C853
C854
C855
C856
C857
C858
C859
C860
C861
C862
C863
C864
C865
C866
C867
C868
C869
C870
C871
C872
C873
C874
C875
C876
C877
C878
C879
C880
C881
C882
C883
C884
C885
C886
C887
C888
C889
C890
C891
C892
C893
C894
C895
C896
C897
C898
C899
C900
C901
C902
C903
C904
C905
C906
C907
C908
C909
C910
C911
C912
C913
C914
C915
C916
C917
C918
C919
C920
C921
C922
C923
C924
C925
C926
C927
C928
C929
C930
C931
C932
C933
C934
C935
C936
C937
C938
C939
C940
C941
C942
C943
C944
C945
C946
C947
C948
C949
C950
C951
C952
C953
C954
C955
C956
C957
C958
C959
C960
C961
C962
C963
C964
C965
C966
C967
C968
C969
C970
C971
C972
C973
C974
C975
C976
C977
C978
C979
C980
C981
C982
C983
C984
C985
C986
C987
C988
C989
C990
C991
C992
C993
C994
C995
C996
C997
C998
C999
C1000

VR602
XP

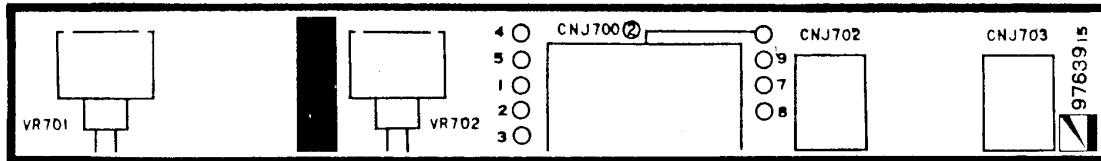
C618
C619
C630
C631
C632
C633
C634
C635
C636
C637
C638
C639
C640
C641
C642
C643
C644
C645
C646
C647
C648
C649
C650
C651
C652
C653
C654
C655
C656
C657
C658
C659
C660
C661
C662
C663
C664
C665
C666
C667
C668
C669
C670
C671
C672
C673
C674
C675
C676
C677
C678
C679
C680
C681
C682
C683
C684
C685
C686
C687
C688
C689
C690
C691
C692
C693
C694
C695
C696
C697
C698
C699
C700
C701
C702
C703
C704
C705
C706
C707
C708
C709
C710
C711
C712
C713
C714
C715
C716
C717
C718
C719
C720
C721
C722
C723
C724
C725
C726
C727
C728
C729
C730
C731
C732
C733
C734
C735
C736
C737
C738
C739
C740
C741
C742
C743
C744
C745
C746
C747
C748
C749
C750
C751
C752
C753
C754
C755
C756
C757
C758
C759
C760
C761
C762
C763
C764
C765
C766
C767
C768
C769
C770
C771
C772
C773
C774
C775
C776
C777
C778
C779
C780
C781
C782
C783
C784
C785
C786
C787
C788
C789
C790
C791
C792
C793
C794
C795
C796
C797
C798
C799
C800
C801
C802
C803
C804
C805
C806
C807
C808
C809
C810
C811
C812
C813
C814
C815
C816
C817
C818
C819
C820
C821
C822
C823
C824
C825
C826
C827
C828
C829
C830
C831
C832
C833
C834
C835
C836
C837
C838
C839
C840
C841
C842
C843
C844
C845
C846
C847
C848
C849
C850
C851
C852
C853
C854
C855
C856
C857
C858
C859
C860
C861
C862
C863
C864
C865
C866
C867
C868
C869
C870
C871
C872
C873
C874
C875
C876
C877
C878
C879
C880
C881
C882
C883
C884
C885
C886
C887
C888
C889
C890
C891
C892
C893
C894
C895
C896
C897
C898
C899
C900
C901
C902
C903
C904
C905
C906
C907
C908
C909
C910
C911
C912
C913
C914
C915
C916
C917
C918
C919
C920
C921
C922
C923
C924
C

VR AND CONNECTOR BD

UP-76391

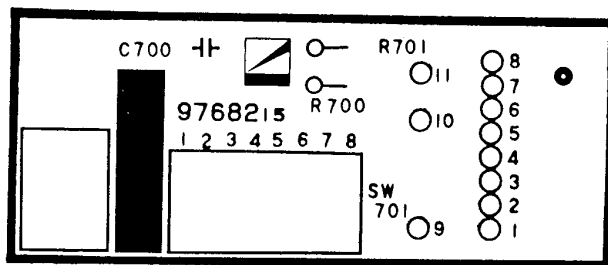
UP-76392

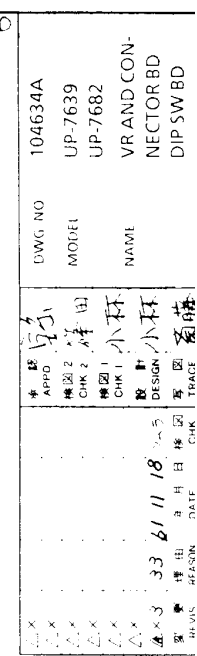
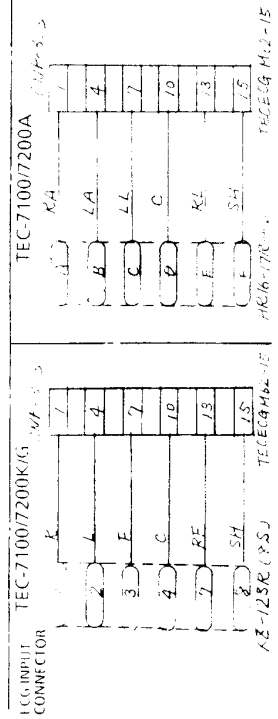
UP-76393



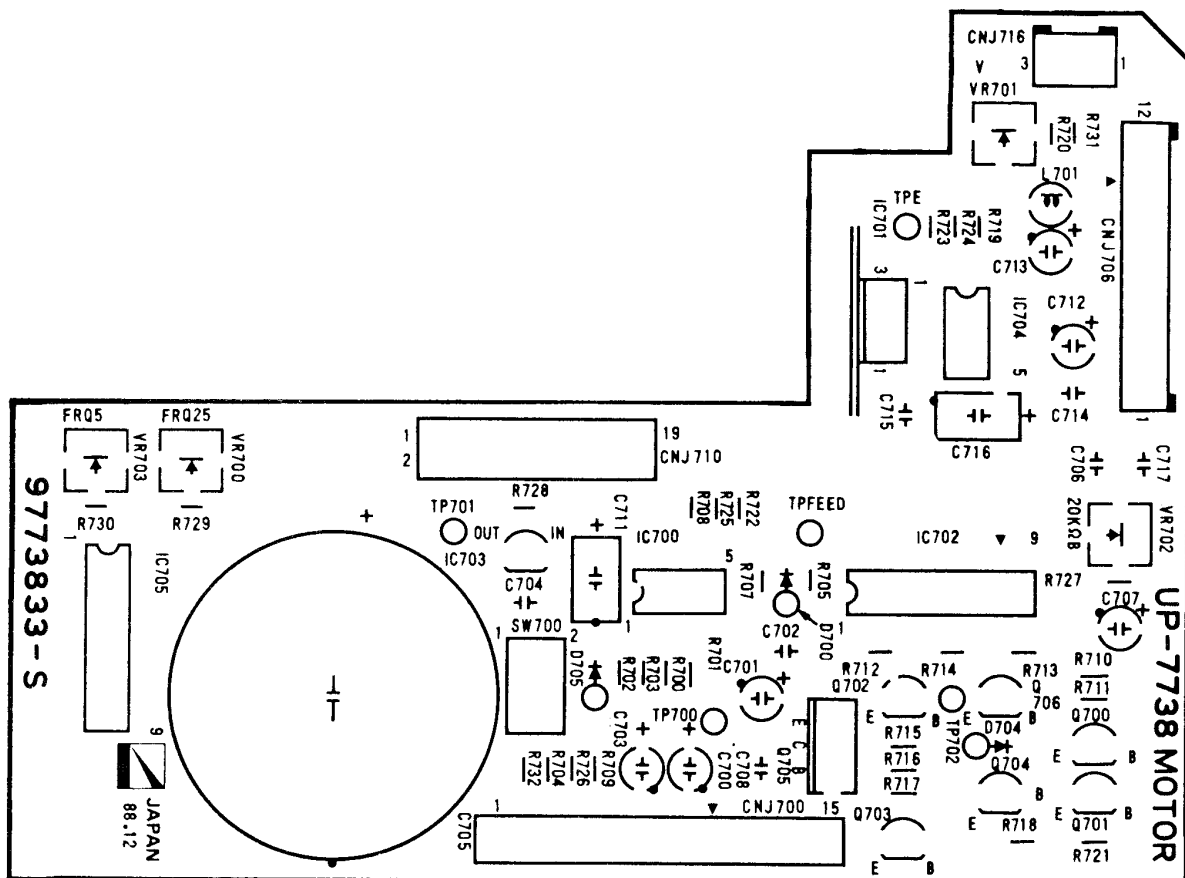
DIP SW BD

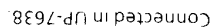
UP-7682

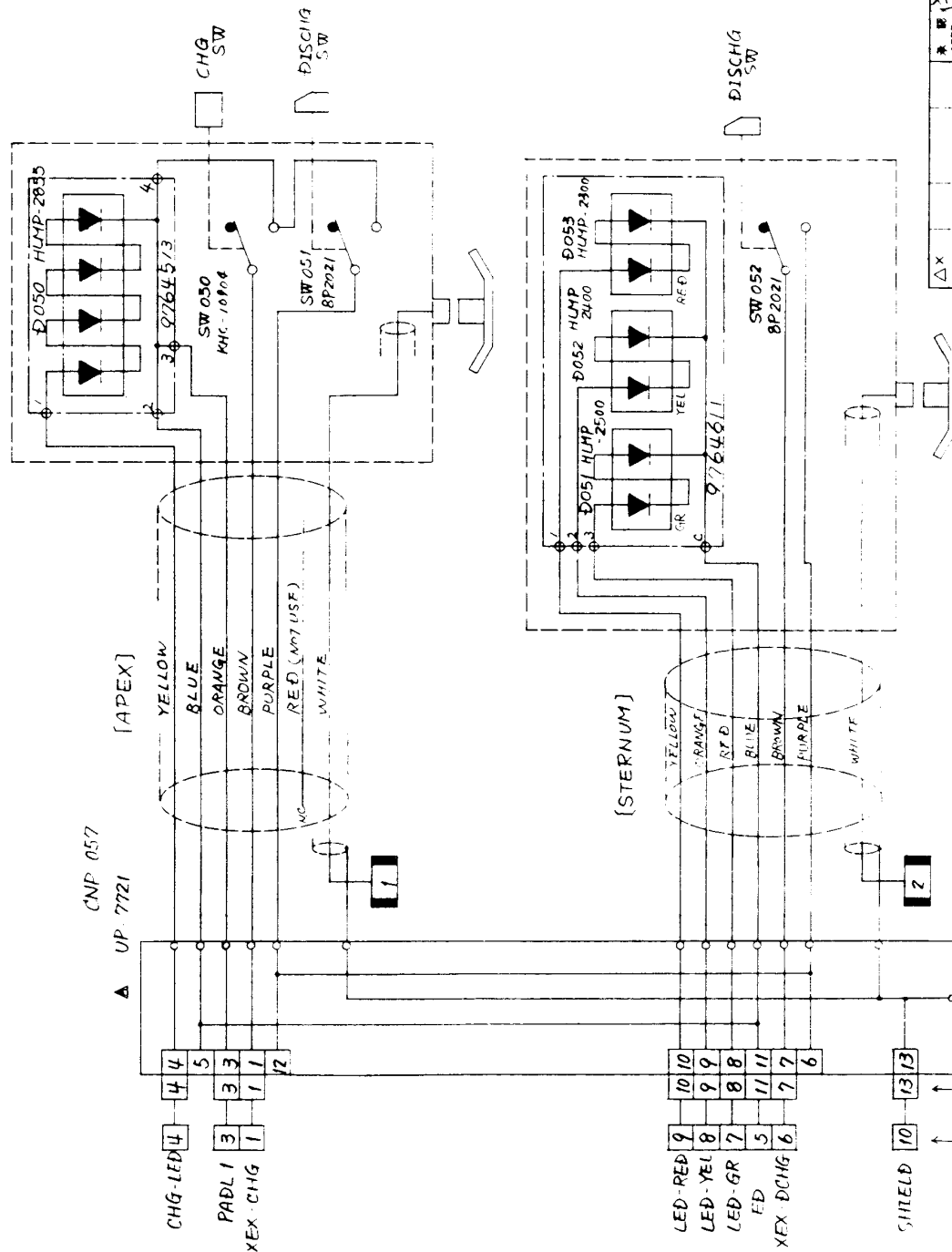




MOTOR CONTROL BD
UP-7738



[illegible]



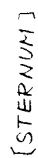
TEC7100/7200/7300.01

11.35 / 11.36

[illegible]

1-08330-1

(PADDLE CONNECTOR)



140 7154 (435)
 141 7170 (475)

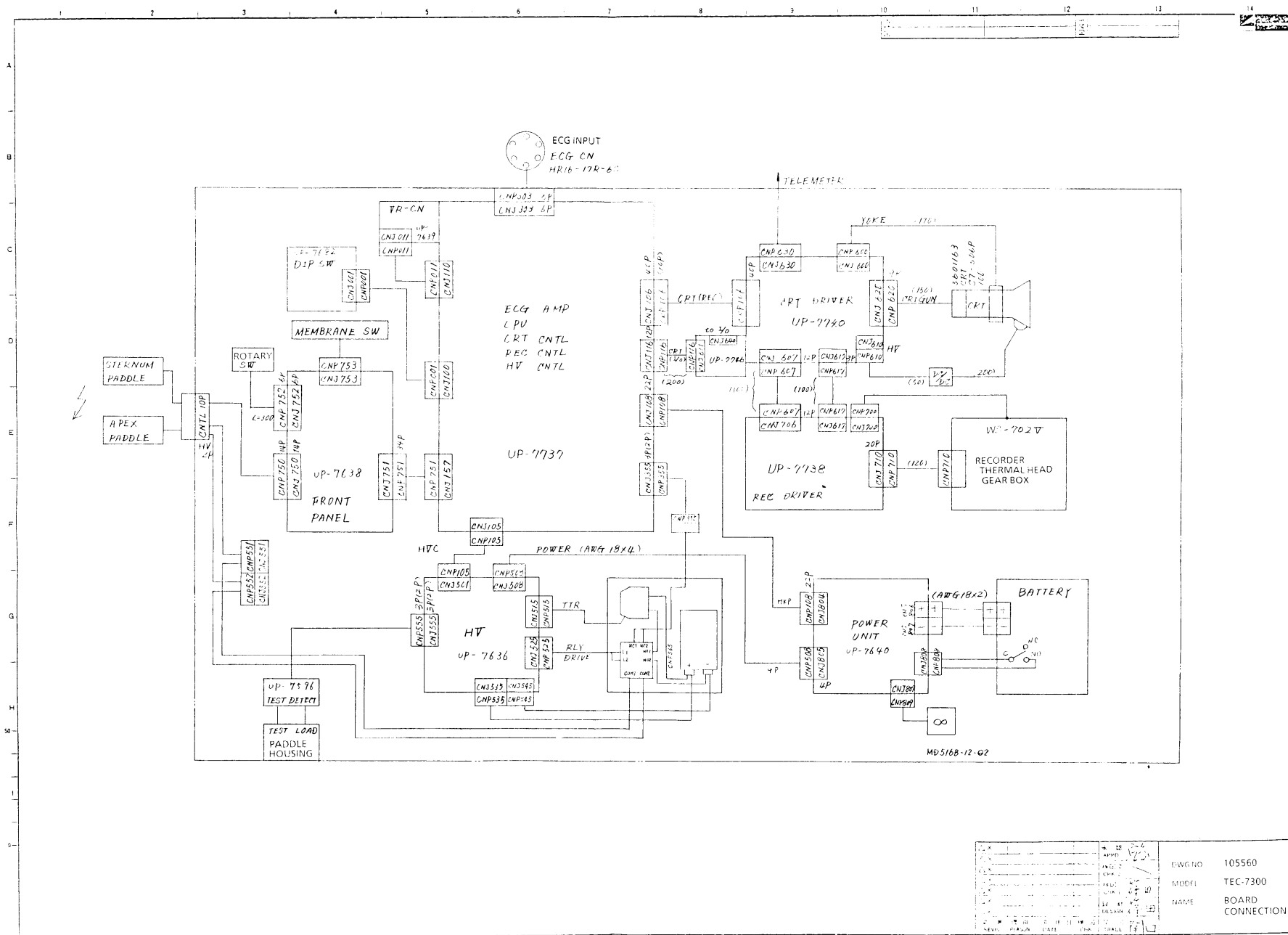
NE-7307 : HANDLE

$$\Delta E_{\pi\pi}^{VV} + \Delta O_{\pi\pi}^{VV} \approx \Delta E_{\pi\pi}^{LL} - O_N$$
$$\Delta 511.0 \text{ eV} + 100.6 \text{ eV} : \Delta 526.0 \text{ eV}$$
$$A_{\mu\nu}Q^\nu + A_{0\ell\ell}Q^\nu; \quad A_{\ell\ell\ell}Q^\nu$$

□ : 20/330 1

□ : 550036-2

[illegible]



1	2	3	4	5	6	7	8	9	10
CNJ 057(CHASSIS) CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW) M60-12-30-114P CNJ 106(CPU) H6F3A50 40B to CNJ601(CRT.REC) CNJ 108(CPU) H6F3A50 40B to CNJ804(POWER) H6F-22H5-11B7									
CNJ 110(CPU) M60-12-30-114 to CNJ011(NR CONNECTORBD) M60-12-30-114 CNJ 116(CPU) M60-12-30-114 to CNJ611(I/O CONNECTORBD) M60-12-30-114									
CNJ 105(CPU) M60-12-30-114P to CNJ001(DIP-SW									

CNJ 157 (CPU)
HLE 3FB-34PA-2.54DS
to CNJ051 (FRONT PANEL)
HLE 23A-34D-BG(10)

CNJ 303 (ECG AMP)
M60-15-30-114
to CNJ 003 (ECG CONNECTOR)
HR16-17R-6S

CNJ 511 (HV)
350543-1 (AMP)
to CNJ 005 (POWER)
350543-1 (AMP)

CNJ 355 (ECG AMP)
M60-3-30-114
to CNJ 553 (HU UNIT)
M60-3-30-114

CNJ 600 (CRT)
HKP-10M53-1T
to YOKE

S0	1	2	S1	1	RA (R)	1	12VCHG	1	P-ECG S	1	X1
S2	3	4	S3	2	—	2	+12VCHG	2	—	2	X2
R0	5	6	R1	3	—	3	—	3	P-ECG A	3	Y1
R2	7	8	R3	4	LA (L)	4	—	4	—	4	Y2
ESEL-0	9	10	ESEL-1	5	—	5	—	5	—	5	Y2
ESEL-2	11	12	ESEL-3	6	—	6	—	6	—	6	Y2
DISP-0	13	14	DISP-1	7	LL (F)	7	—	7	—	7	Y2
DISP-2	15	16	EX-CHG	8	—	8	—	8	—	8	Y2
EX-DISCHG	17	18	LED-RED	9	—	9	—	9	—	9	Y2
LED-YEL	19	20	LED-GR	10	RL (Rf)	10	—	10	—	10	Y2
CHG-LED	21	22	PADL 1	11	—	11	—	11	—	11	Y2
PADL 2	23	24	BELL OUT	12	—	12	—	12	—	12	Y2
CNTL	25	26	BATTCHG	13	V (C)	13	—	13	—	13	Y2
ED	27	28	+5V	14	—	14	—	14	—	14	Y2
ED	29	30	+5V	15	SHIELD	15	—	15	—	15	Y2
POWER FN	31	32	+12VB	—	—	—	—	—	—	—	Y2
—	33	34	—	—	—	—	—	—	—	—	Y2

CNJ 611 (I/O CONNECTOR BD)
M60-12-30-134
to OPTIONAL UNIT

CNJ 617 (CRT)
M60-03-30-134
to CNJ 716 (REC)
M60-03-30-114

CNJ 806 (POWER)
170267-1
to BATTERY

CNJ 807 (POWER)
170267-1
to BATTERY

CNJ 808 (POWER)
170267-1
to BATTERY

CNJ 809 (POWER)
170267-1
to BATTERY

CNJ 607 (CRT)	1	ER	1	G1	1	BAT -	1	BAT -	1	BAT -
M60-12-30-114	2	ER	2	K	2	LED -	2	LED -	2	LED -
to CNJ 106 (REC)	3	+12VREC	3	H	3	—	3	—	3	—
M60-12-30-114	4	SIN	4	H	4	—	4	—	4	—
to CNJ 106 (REC)	5	STB	5	—	5	—	5	—	5	—
M60-12-30-114	6	PRT CLK	6	G2	6	—	6	—	6	—
to CNJ 106 (REC)	7	ENB	7	G4	7	—	7	—	7	—
M60-12-30-114	8	+5V	8	—	8	—	8	—	8	—
to CNJ 106 (REC)	9	REC	9	—	9	—	9	—	9	—
M60-12-30-114	10	NO PAPER	10	—	10	—	10	—	10	—
to CNJ 106 (REC)	11	FF	11	—	11	—	11	—	11	—
M60-12-30-114	12	SOUT	12	—	12	—	12	—	12	—
to CNJ 106 (REC)	—	—	—	—	—	—	—	—	—	—

CNJ 607 (CRT)	1	ER	1	G1	1	BAT -	1	BAT -	1	BAT -
M60-12-30-114	2	ER	2	K	2	LED -	2	LED -	2	LED -
to CNJ 106 (REC)	3	+12VREC	3	H	3	—	3	—	3	—
M60-12-30-114	4	SIN	4	H	4	—	4	—	4	—
to CNJ 106 (REC)	5	STB	5	—	5	—	5	—	5	—
M60-12-30-114	6	PRT CLK	6	G2	6	—	6	—	6	—
to CNJ 106 (REC)	7	ENB	7	G4	7	—	7	—	7	—
M60-12-30-114	8	+5V	8	—	8	—	8	—	8	—
to CNJ 106 (REC)	9	REC	9	—	9	—	9	—	9	—
M60-12-30-114	10	NO PAPER	10	—	10	—	10	—	10	—
to CNJ 106 (REC)	11	FF	11	—	11	—	11	—	11	—
M60-12-30-114	12	SOUT	12	—	12	—	12	—	12	—
to CNJ 106 (REC)	—	—	—	—	—	—	—	—	—	—

△X	△X	△X	△X	△X	△X	△X	△X	△X	△X	△X
APPD	CHK 2	CHK 1	CHK 1	CHK 1	CHK 1	CHK 1	CHK 1	CHK 1	CHK 1	CHK 1
TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300	TEC 7300
CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR	CONNECTOR
PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)	PIN ASSIGNMENT (2/3)

NEW! The Big Green Book

CNJ 752 (ENERGY SELECTOR)

MS60-06-30-114P

CNIJ 750 (FRONT PANEL)

196-SW71-KP-14MS-7BT

CNJ 057 (PADDEL CONN)

CNJ 710 (REC)

HKP-20MS10BT

(THE)

CNY 700 (REC)

60-11-30-114

RECORDED

[illegible]

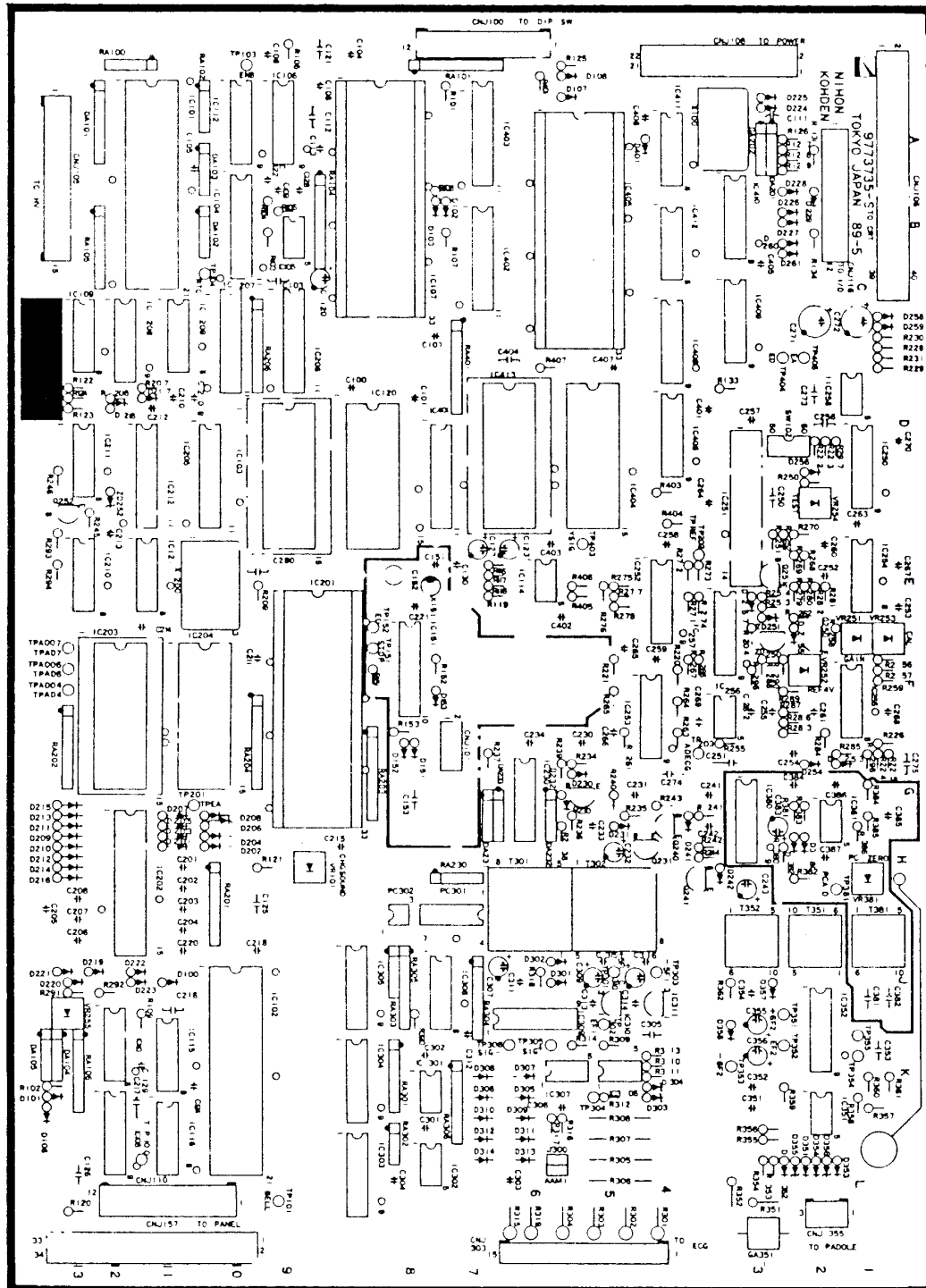
TEC7100/7200/7300.01

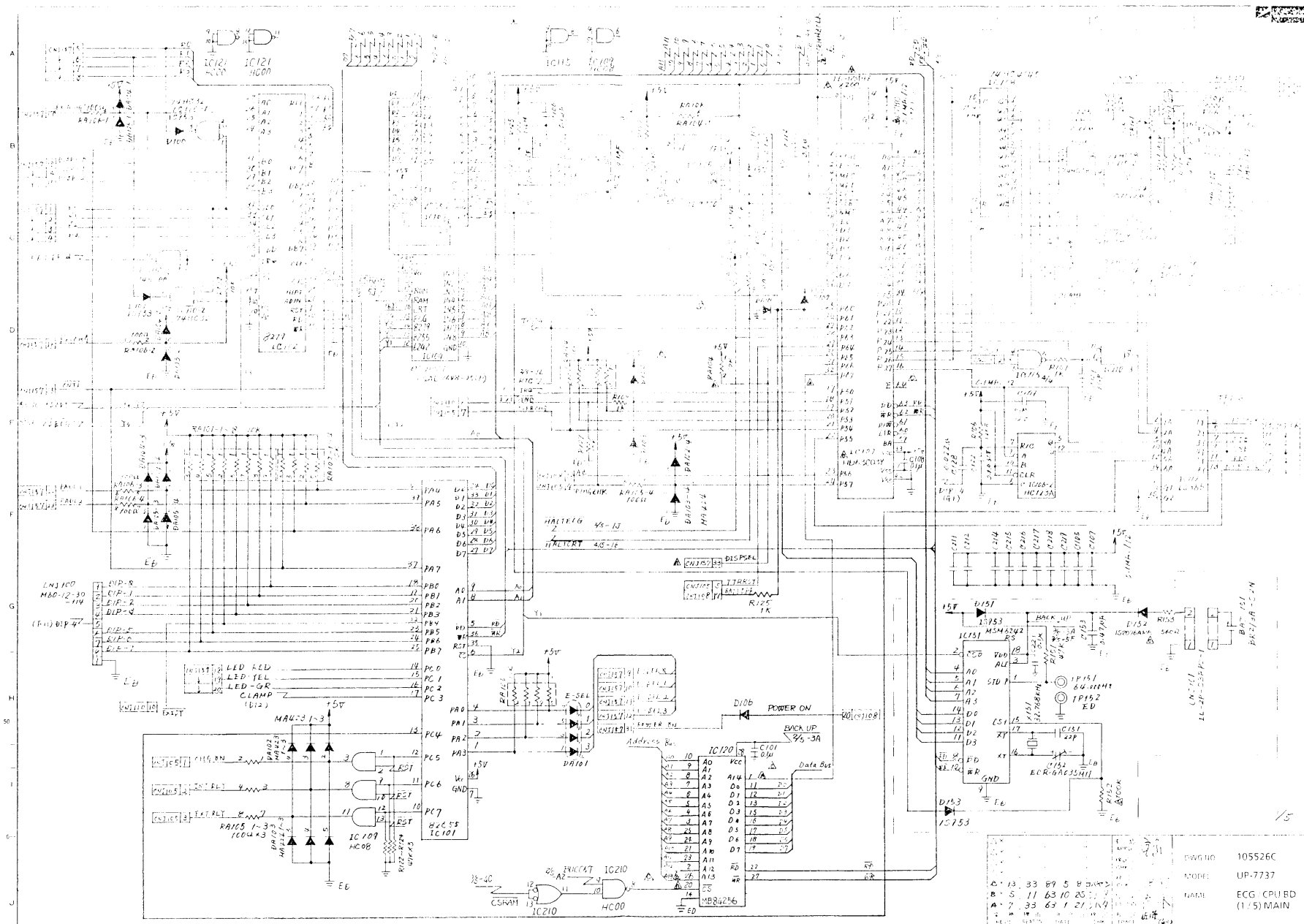
50-

05

11.45

ECG / CPU BD
UP-7737

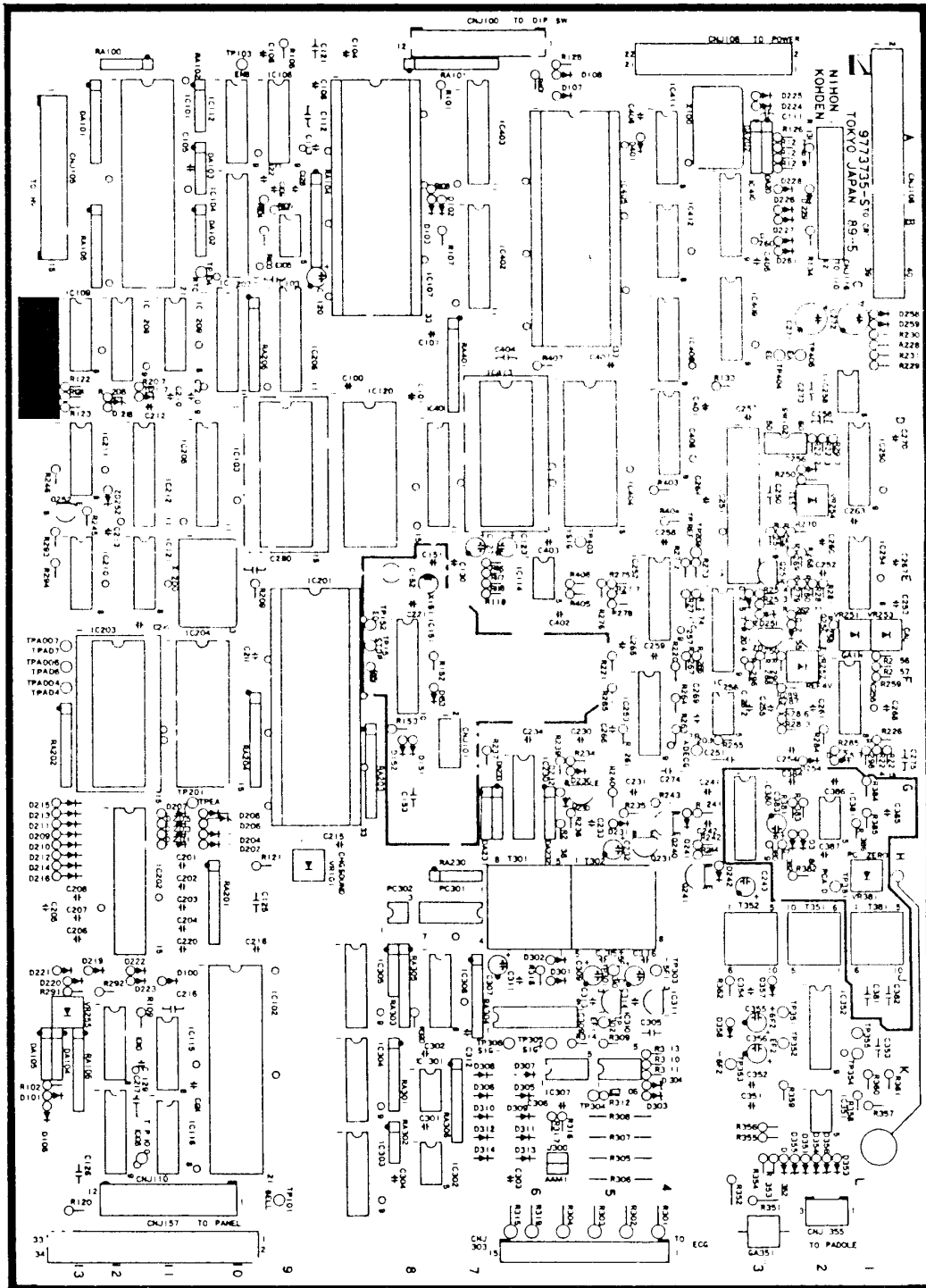


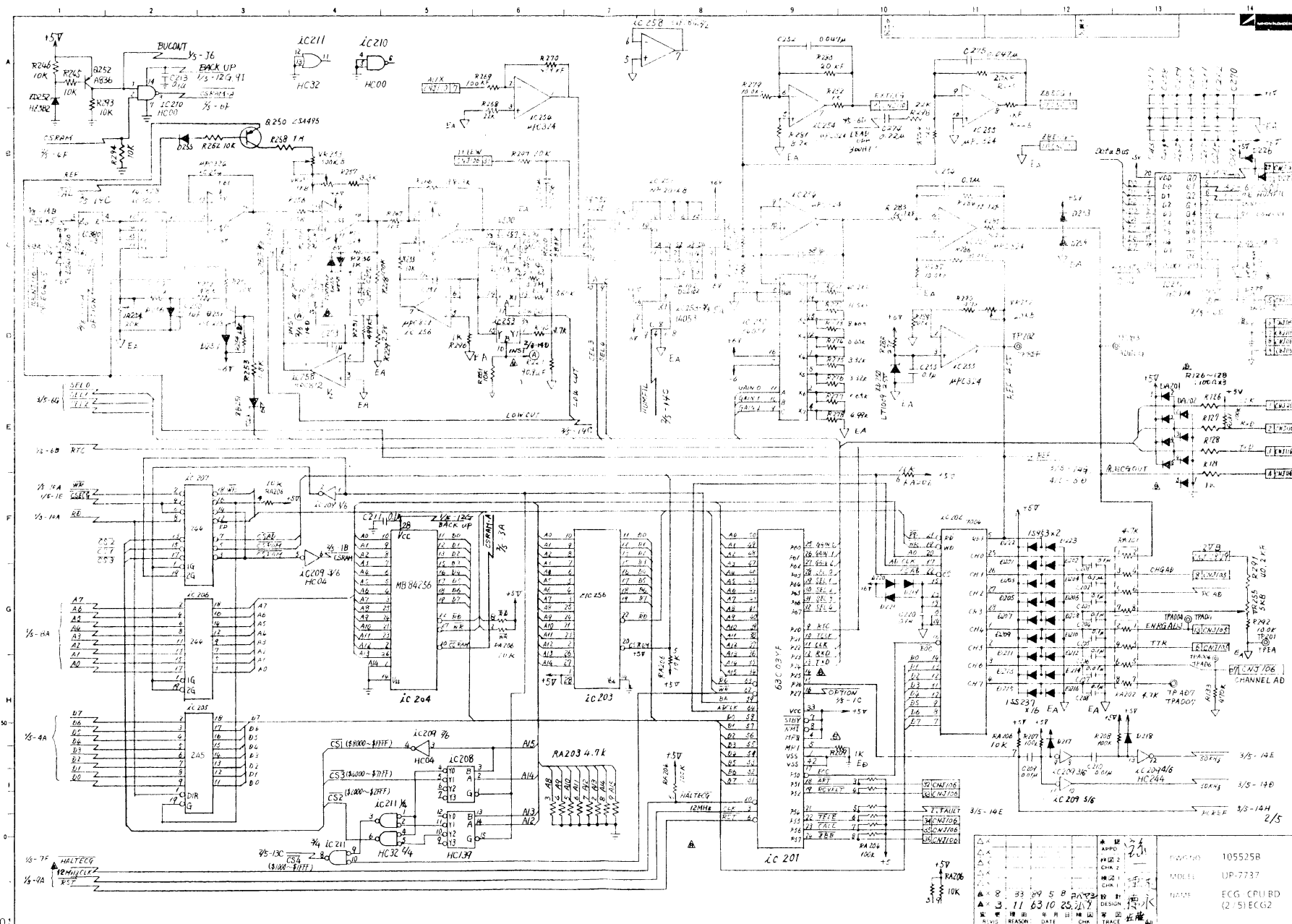


TEC1100/7200/7300.01

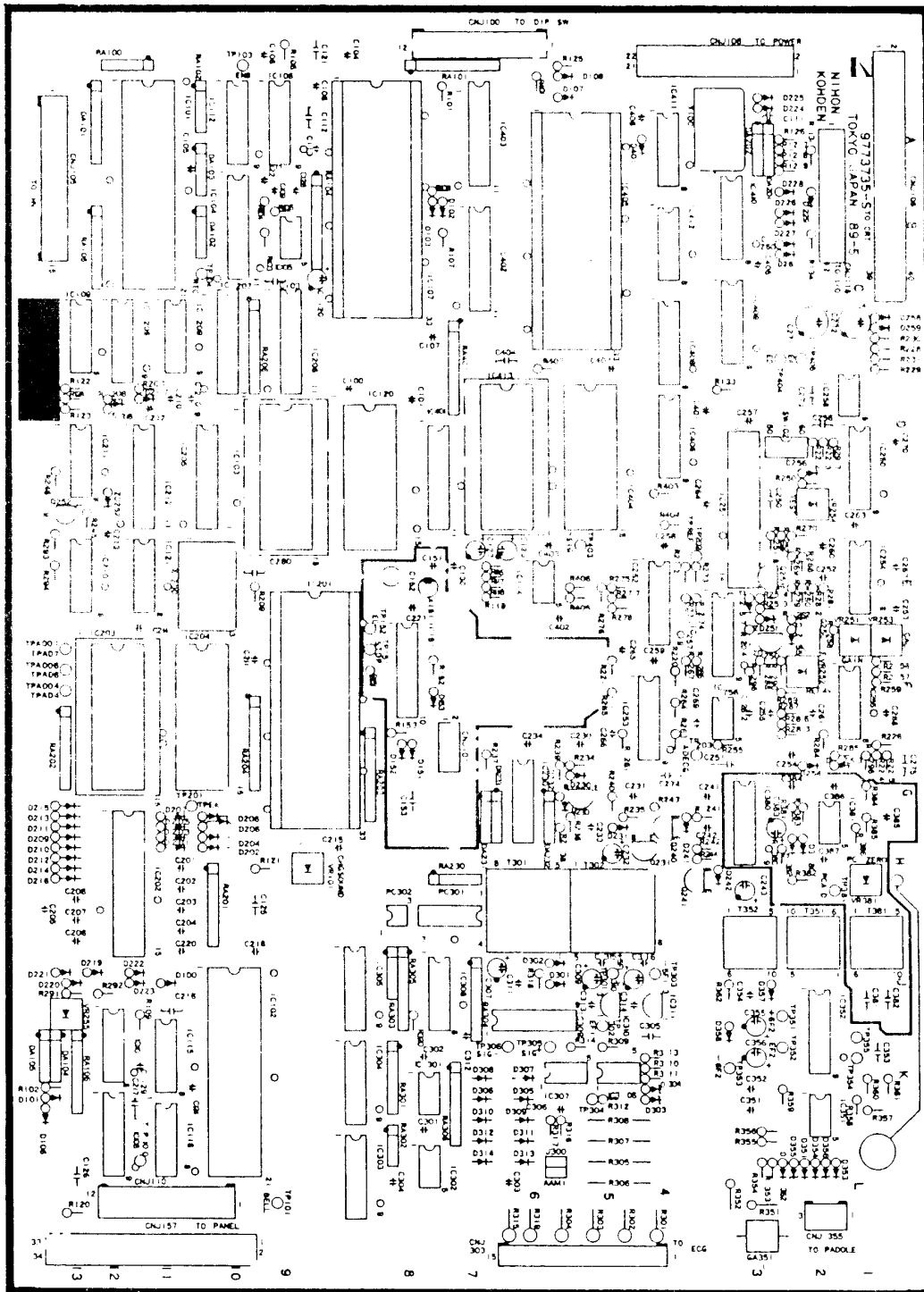
DWG NO 105526C
 MODEL UP-7737
 NAME ECG CPU BD
 (1/5) MAIN

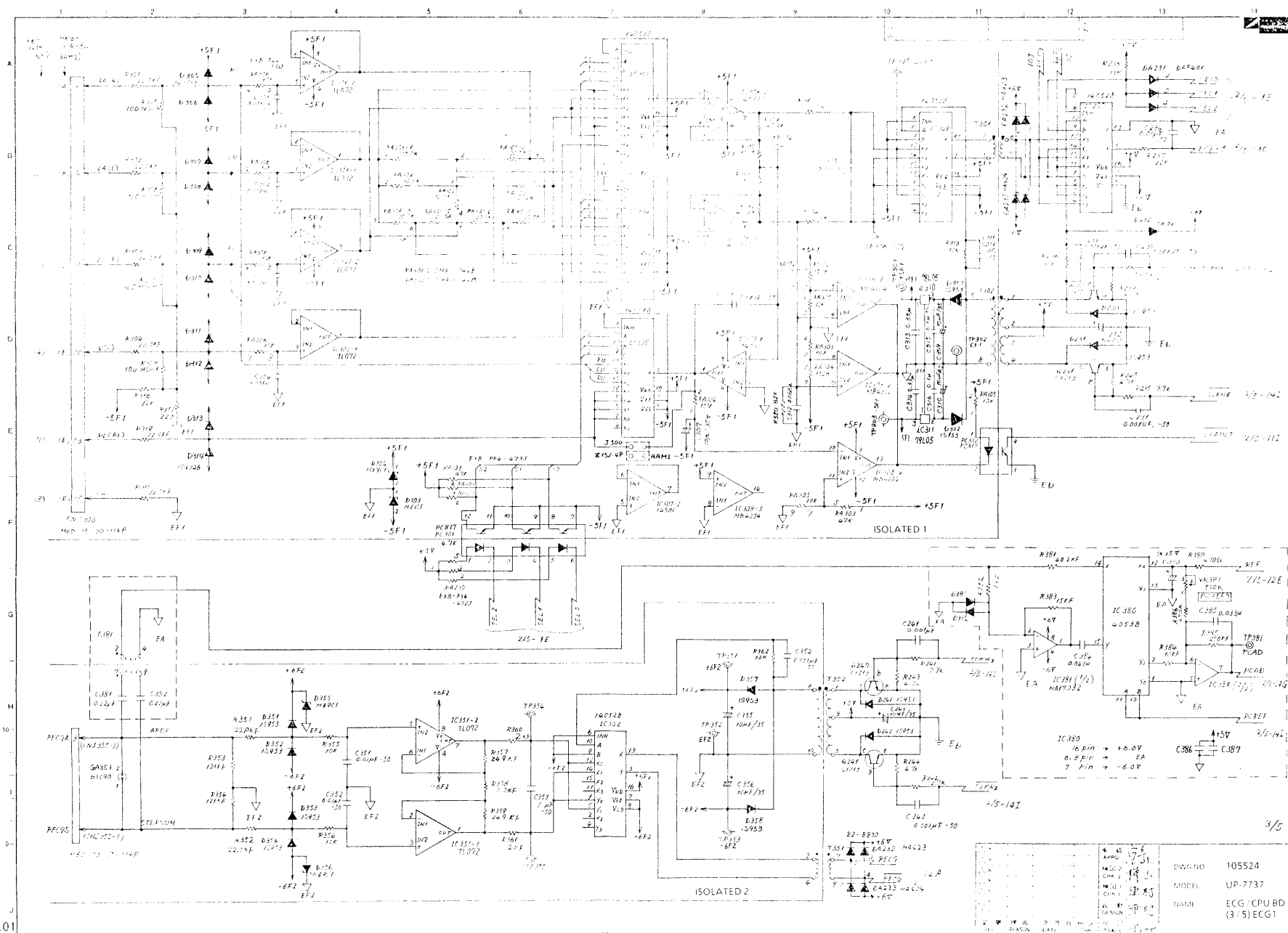
ECG / CPU BD
UP-7737



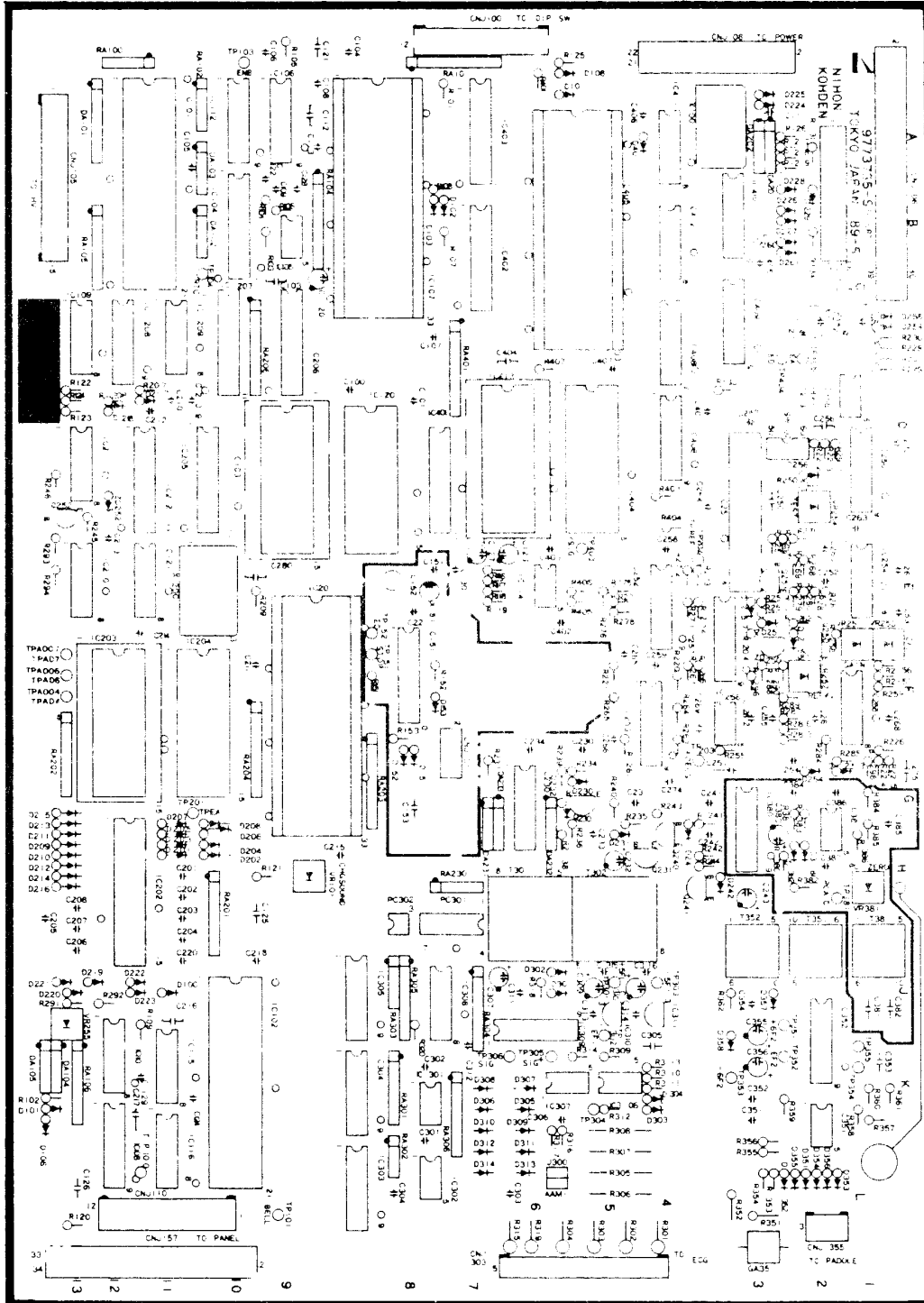


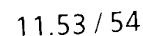
ECG / CPU BD
UP-7737

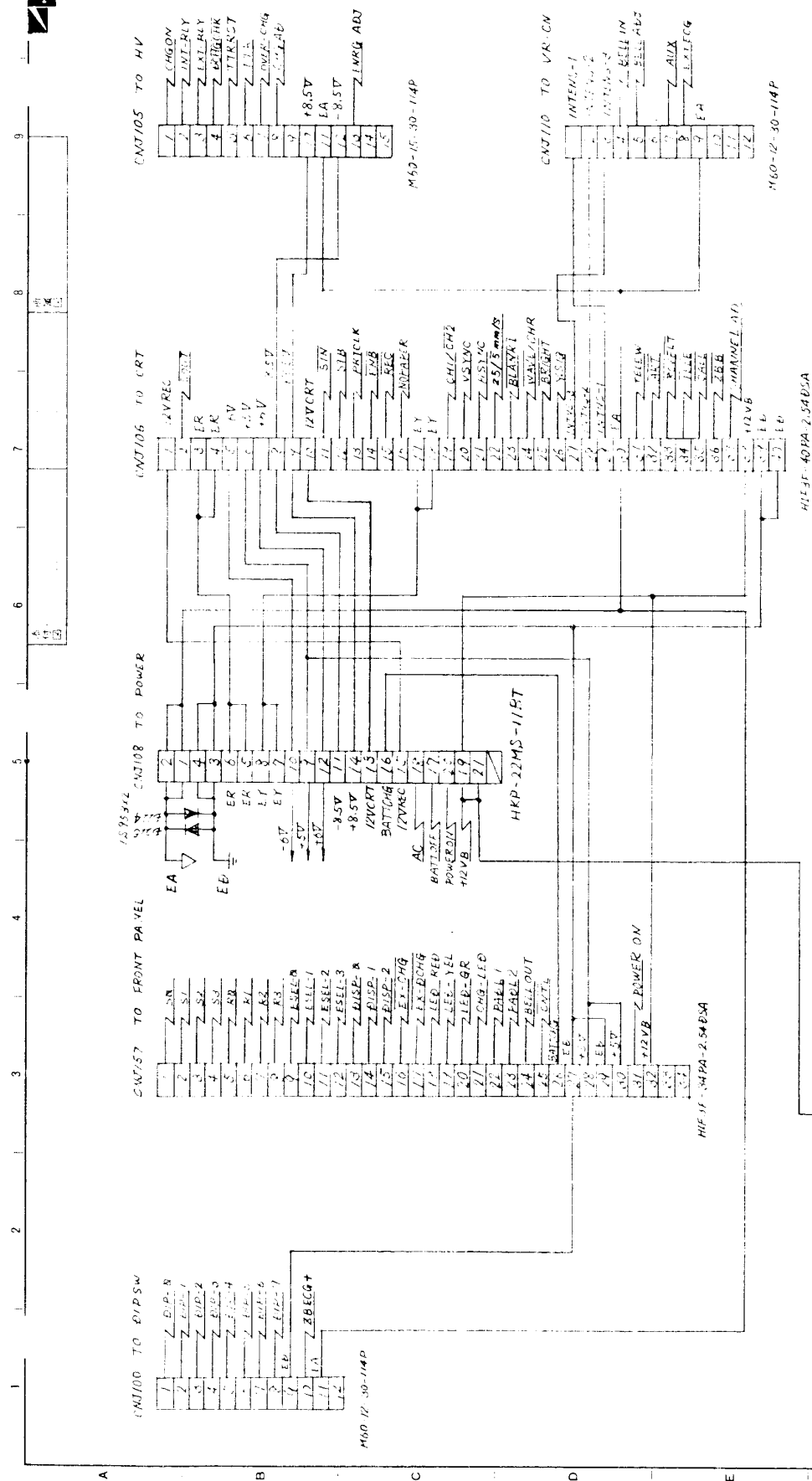




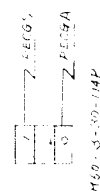
ECG / CPU BD
UP-7737



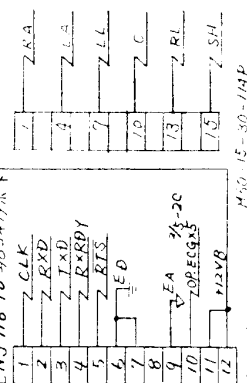




CW355 TO EXT RY

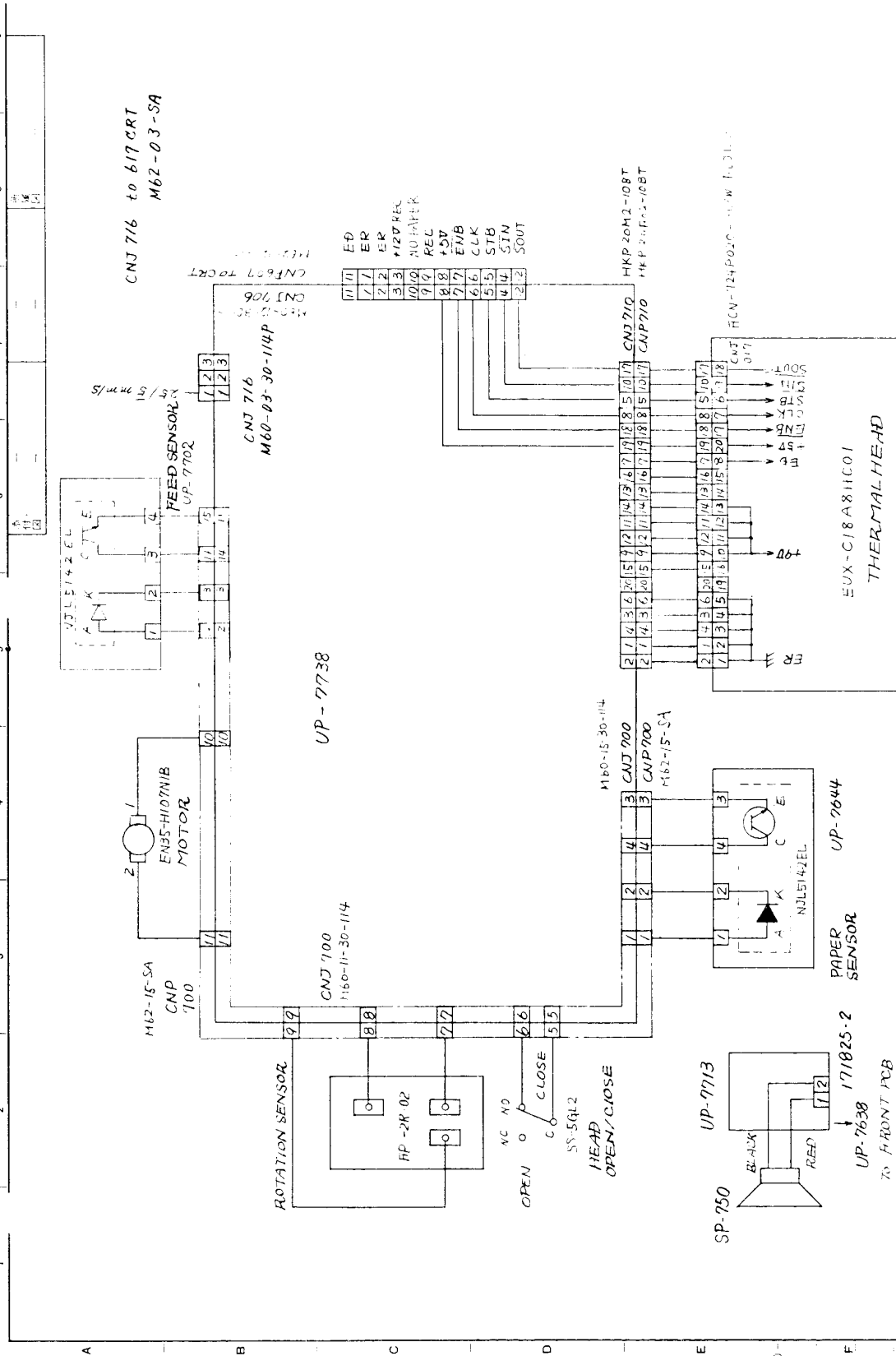

$$160 \cdot 5 = 800 = 1142$$

W323 TO ECG CN



471-05-27-0114

NO.	DATE	BY	CHKD	APPD	REMARKS
1	10/20/00	WALSH	WALSH	WALSH	105528
2	10/20/00	WALSH	WALSH	WALSH	UP: 7737
3	10/20/00	WALSH	WALSH	WALSH	ECG / CPU BD
4	10/20/00	WALSH	WALSH	WALSH	(5/5)
5	10/20/00	WALSH	WALSH	WALSH	CONNECTOR



TEC7100/7200/7300.01

11.57

APPD	CHK 2	CHK 1	DESIGN
CHK 2	CHK 1	DESIGN	
CHK 1	DESIGN		
DESIGN			

年月日 出 月 日 月 日 月 日

105561
EUGRO
WS-702V
MOTOR
CONTROL BD

BD

1300-4 (RED)

D510

D511

R529

R530

R531

D513

D512

1300-8 (WHITE)

INSULATOR

9785107 HV-G

CAP +

CAP -

R318

R517

CN 575

2 1

IC801

IC802

IC803

IC804

IC805

IC806

IC807

IC808

IC809

IC810

IC811

IC812

IC813

IC814

IC815

IC816

IC817

IC818

IC819

IC820

IC821

IC822

IC823

IC824

IC825

IC826

IC827

IC828

IC829

IC830

IC831

IC832

IC833

IC834

IC835

IC836

IC837

IC838

IC839

IC840

IC841

IC842

IC843

IC844

IC845

IC846

IC847

IC848

IC849

IC850

IC851

IC852

IC853

IC854

IC855

IC856

IC857

IC858

IC859

IC860

IC861

IC862

IC863

IC864

IC865

IC866

IC867

IC868

IC869

IC870

IC871

IC872

IC873

IC874

IC875

IC876

IC877

IC878

IC879

IC880

IC881

IC882

IC883

IC884

IC885

IC886

IC887

IC888

IC889

IC890

IC891

IC892

IC893

IC894

IC895

IC896

IC897

IC898

IC899

IC900

IC901

IC902

IC903

IC904

IC905

IC906

IC907

IC908

IC909

IC910

IC911

IC912

IC913

IC914

IC915

IC916

IC917

IC918

IC919

IC920

IC921

IC922

IC923

IC924

IC925

IC926

IC927

IC928

IC929

IC930

IC931

IC932

IC933

IC934

IC935

IC936

IC937

IC938

IC939

IC940

IC941

IC942

IC943

IC944

IC945

IC946

IC947

IC948

IC949

IC950

IC951

IC952

IC953

IC954

IC955

IC956

IC957

IC958

IC959

IC960

IC961

IC962

IC963

IC964

IC965

IC966

IC967

IC968

IC969

IC970

IC971

IC972

IC973

IC974

IC975

IC976

IC977

IC978

IC979

IC980

IC981

IC982

IC983

IC984

IC985

IC986

IC987

IC988

IC989

IC990

IC991

IC992

IC993

IC994

IC995

IC996

IC997

IC998

IC999

IC1000

IC1001

IC1002

IC1003

IC1004

IC1005

IC1006

IC1007

IC1008

IC1009

IC1010

IC1011

IC1012

IC1013

IC1014

IC1015

IC1016

IC1017

IC1018

IC1019

IC1020

IC1021

IC1022

IC1023

IC1024

IC1025

IC1026

IC1027

IC1028

IC1029

IC1030

IC1031

IC1032

IC1033

IC1034

IC1035

IC1036

IC1037

IC1038

IC1039

IC1040

IC1041

IC1042

IC1043

IC1044

IC1045

IC1046

IC1047

IC1048

IC1049

IC1050

IC1051

IC1052

IC1053

IC1054

IC1055

IC1056

IC1057

IC1058

IC1059

IC1060

IC1061

IC1062

IC1063

IC1064

IC1065

IC1066

IC1067

IC1068

IC1069

IC1070

IC1071

IC1072

IC1073

IC1074

IC1075

IC1076

IC1077

IC1078

IC1079

IC1080

IC1081

IC1082

IC1083

IC1084

IC1085

IC1086

IC1087

IC1088

IC1089

IC1090

IC1091

IC1092

IC1093

IC1094

IC1095

IC1096

IC1097

IC1098

IC1099

IC1100

IC1101

IC1102

IC1103

IC1104

IC1105

IC1106

IC1107

IC1108

IC1109

IC1110

IC1111

IC1112

IC1113

IC1114

IC1115

IC1116

IC1117

IC1118

IC1119

IC1120

IC1121

IC1122

IC1123

IC1124

IC1125

IC1126

IC1127

IC1128

IC1129

IC1130

IC1131

IC1132

IC1133

IC1134

IC1135

IC1136

IC1137

IC1138

IC1139

IC1140

IC1141

IC1142

IC1143

IC1144

IC1145

IC1146

IC1147

IC1148

IC1149

IC1150

IC1151

IC1152

IC1153

IC1154

IC1155

IC1156

IC1157

IC1158

IC1159

IC1160

IC1161

IC

MANUAL CHANGE INFORMATION

This section of the manual contains information about the operation of the console and the use of the console in the operation of the console.

The console is a device that is used to control the operation of the console. It is used to control the operation of the console and to control the operation of the console.

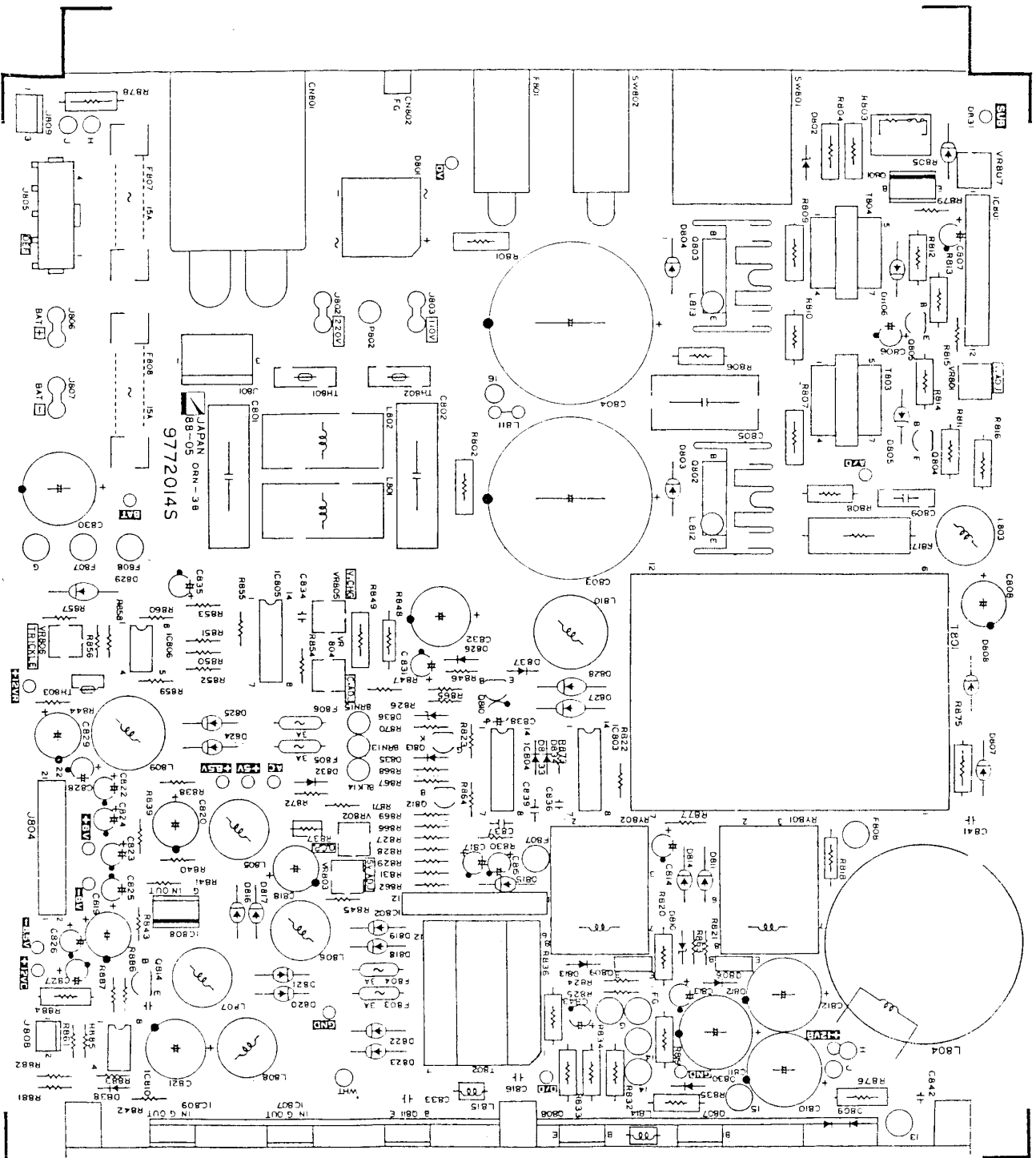
REVISION TABLE (TEC-7100 series)

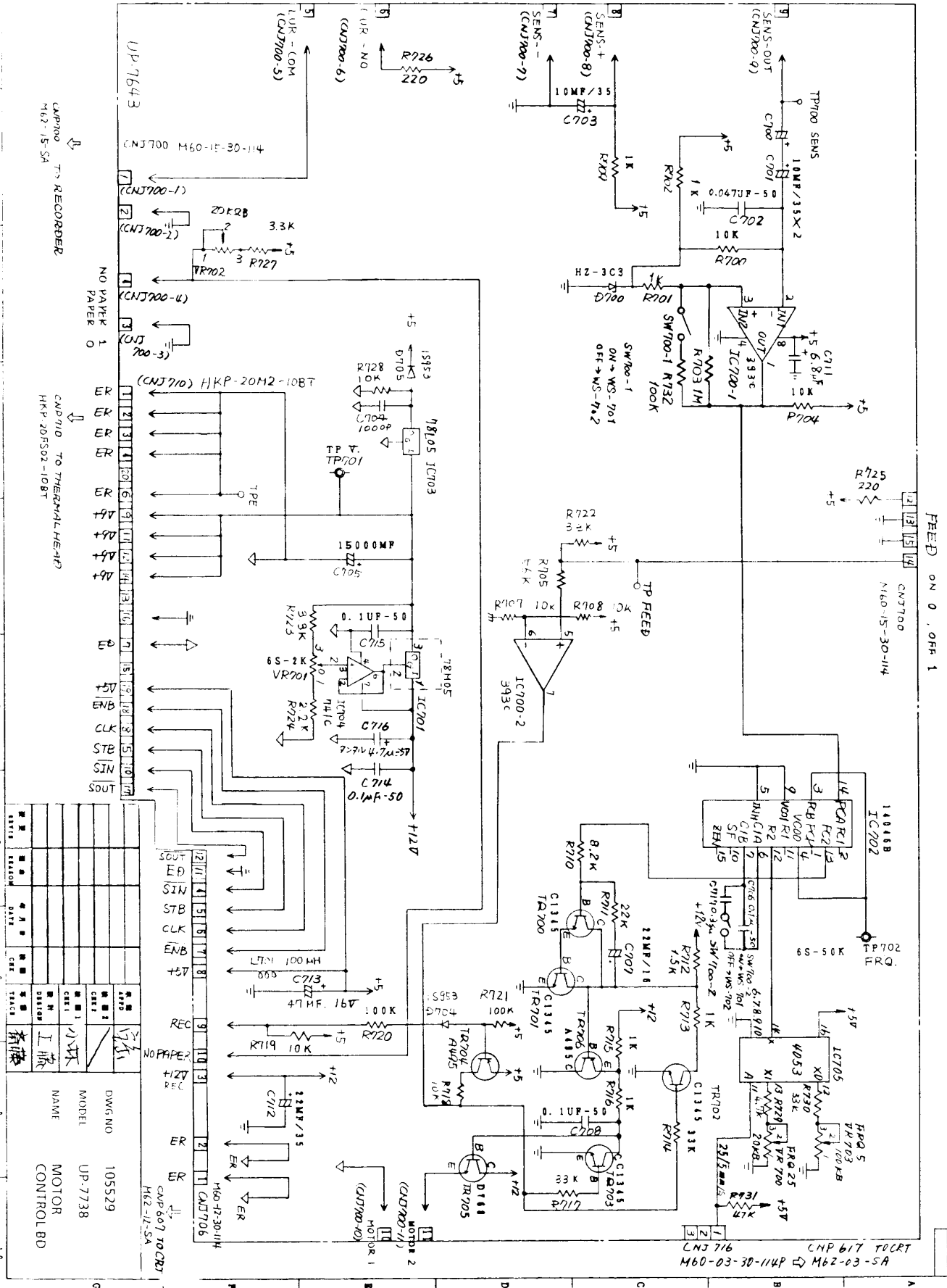
Model	Master Revision	Serial No.
TEC-7100 A . B . C . E . F . G . H . J (K) R	A5 . A6 . A7 . (A8) . A9 B0 . B1 . B2 . B3 . B4	From 21167
ZR-701VK/702V	(A0) . A6 . A7 . A8 . A9 B0 . B1 . B2 . B3 . B4	From 20001

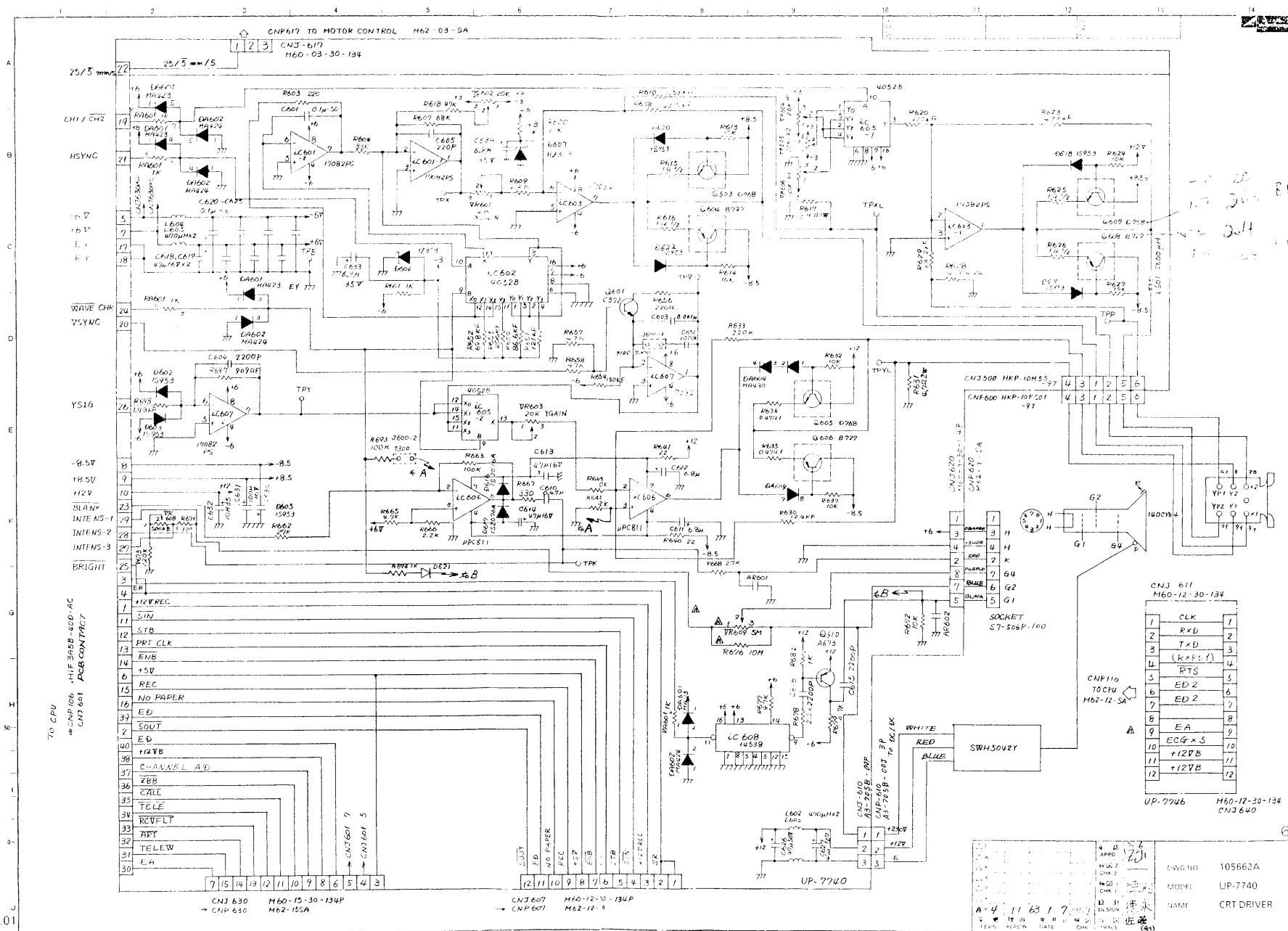
Unit	Description	Component Revision
TEC-7000X	Chassis Parts-1	(A0) . A1 . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
YZ-001G#	Chassis Parts-2	(A0) . A1 . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
TEC-710#Z	Accessories	A0 . A1 . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
ND-701V#	External Paddle	A0 . (A1) . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
SC-701V#	Power Unit	A0 . A1 . (A2) . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
WS-701V#	Recorder Unit	A0 . (A1) . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
UP-7636/7851	High Voltage BD	A0 . A1 . (A2) . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
UP-7740	CRT Driver	A0 . A1 . (A2) . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
UP-7638	Front Panel BD	A0 . (A1) . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
US-7635#	ECG/CPU BD	A0 . A1 . A2 . A3 . A4 . (A5) . A6 . A7 . A8 . A9 . B0 . B1 . B2
ZR-701VK UP-6762A	RF BD	(A0) . A1 . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2
ZR-702V UP-67692	RF BD	A0 . A1 . A2 . A3 . A4 . A5 . A6 . A7 . A8 . A9 . B0 . B1 . B2

Model	YZ-001G#	TEC-710#Z	ND-701V#	SC-701V#	WS-701V#	US-7635#
TEC-7100A	YZ-001G8	TEC-7101Z	ND-701V	SC-701VA	WS-701VA	US-76353
TEC-7100B	YZ-001G9	TEC-7102Z	ND-701V	SC-701VB	WS-701VA	US-76355
TEC-7100C	YZ-001G0	TEC-7102Z	ND-701V	SC-701VK	WS-701VC	US-76355
TEC-7100F	YZ-001G1	TEC-7105Z	ND-701VF	SC-701VF	WS-701VF	US-7635A
TEC-7100G	YZ-001G2	TEC-7103Z	ND-701VG	SC-701VG	WS-701VG	US-76357
TEC-7100R	YZ-001G3	TEC-7106Z	ND-701VR	SC-701VR	WS-701VR	US-76358
TEC-7100J	YZ-001G4	TEC-7104Z	ND-701V	SC-701VJ	WS-701VA	US-76355
TEC-7100K	YZ-001G5	TEC-7102Z	ND-701V	SC-701VK	WS-701VA	US-76355
TEC-7100E	YZ-001G6	TEC-7107Z	ND-701VE	SC-701VE	WS-701VE	US-76359
TEC-7100H	YZ-001G8	TEC-7108Z	ND-701VH	SC-701VH	WS-701VH	US-7635K

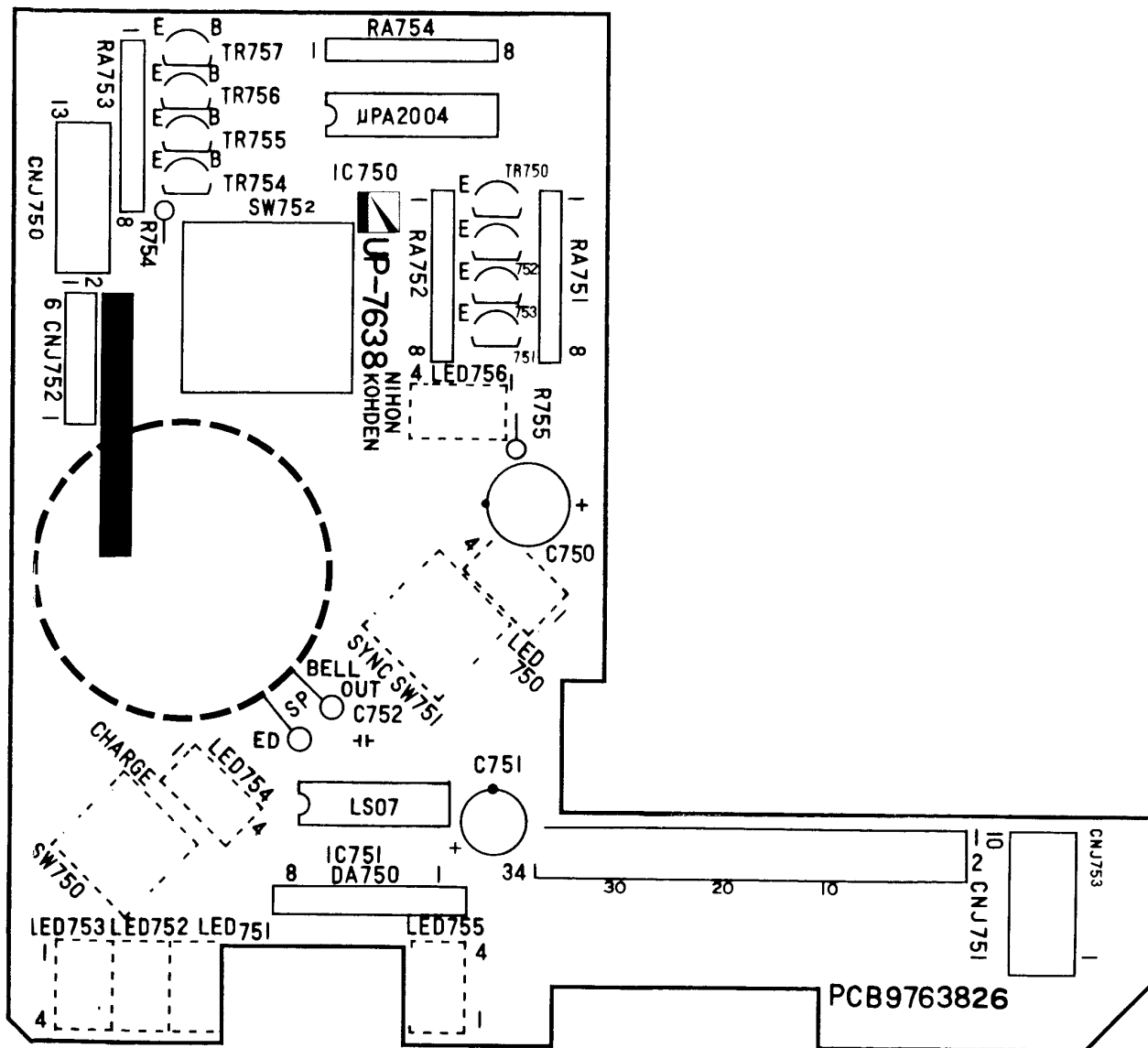
SW REGULATOR UP-7720







FRONT PANEL BD UP-7638



3	2
---	---