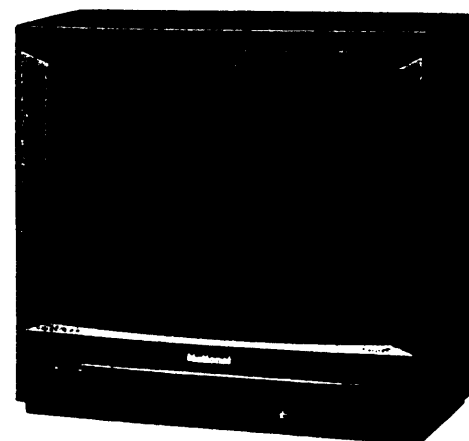


# Service Manual

Colour Television

TC-2091MR

M15L chassis



## Specifications

Power Source : AC 220—240 V, 50 Hz  
Power Consumption : 80 W ( Max. )  
Stand-by condition 7 W  
Aerial Impedance : 75  $\Omega$  unbalanced, Coaxial Type  
Receiving System : PAL - B, G  
Receiving Channels : VHF 2—12  
UHF 21—69  
Intermediate  
Frequency : Video 38.9 MHz  
Sound 33.4 MHz  
Colour 34.47 MHz  
High Voltage : 24.5 kV at zero beam current

Picture Tube : 5130B22H  
5130B22(0)H for S. E. Asia countries  
5130B22(S)H for Fiji  
51 cm ( 20 inches ) measured diagonally,  
90° deflection  
Audio Output : 2.5 W ( Max. )  
Speaker : 12 x 5 cm, 8  $\Omega$ , Oval Type  
Remote Controller : 25 functions Infrared Controller  
Dimensions : Height : 457 mm  
Width : 496 mm  
Depth : 472 mm  
Mass ( Weight ) : 18.0 kg ( Net )

Specifications are subject to change without notice.  
Mass ( Weight ) and dimensions shown are approximate.

 **National**

**Matsushita Electric Industrial Co., Ltd.**  
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IC1103 VOLTAGE TABLE

|                  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| V <sub>CC</sub>  | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| V <sub>DD</sub>  | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| V <sub>SS</sub>  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| V <sub>REF</sub> | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| V <sub>OUT</sub> | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

AERIAL BOARD  
TJB1722406

REMOTE CONTROL RECEIVER  
TNO2618

IC201  
AN5265  
AUDIO OUT

IC1103  
AN5071  
BAND SWITCH

MC-BOARD  
TNP107432

IC101  
AN5138NK  
VIF/SIF

E-BOARD  
TNP197023CE

IC1105  
AN78L05  
5V AVR

IC1102  
MN15142TEA1  
MPU

IC1106  
MN1280-P  
RESET

IC802  
AN7812  
12V AVR

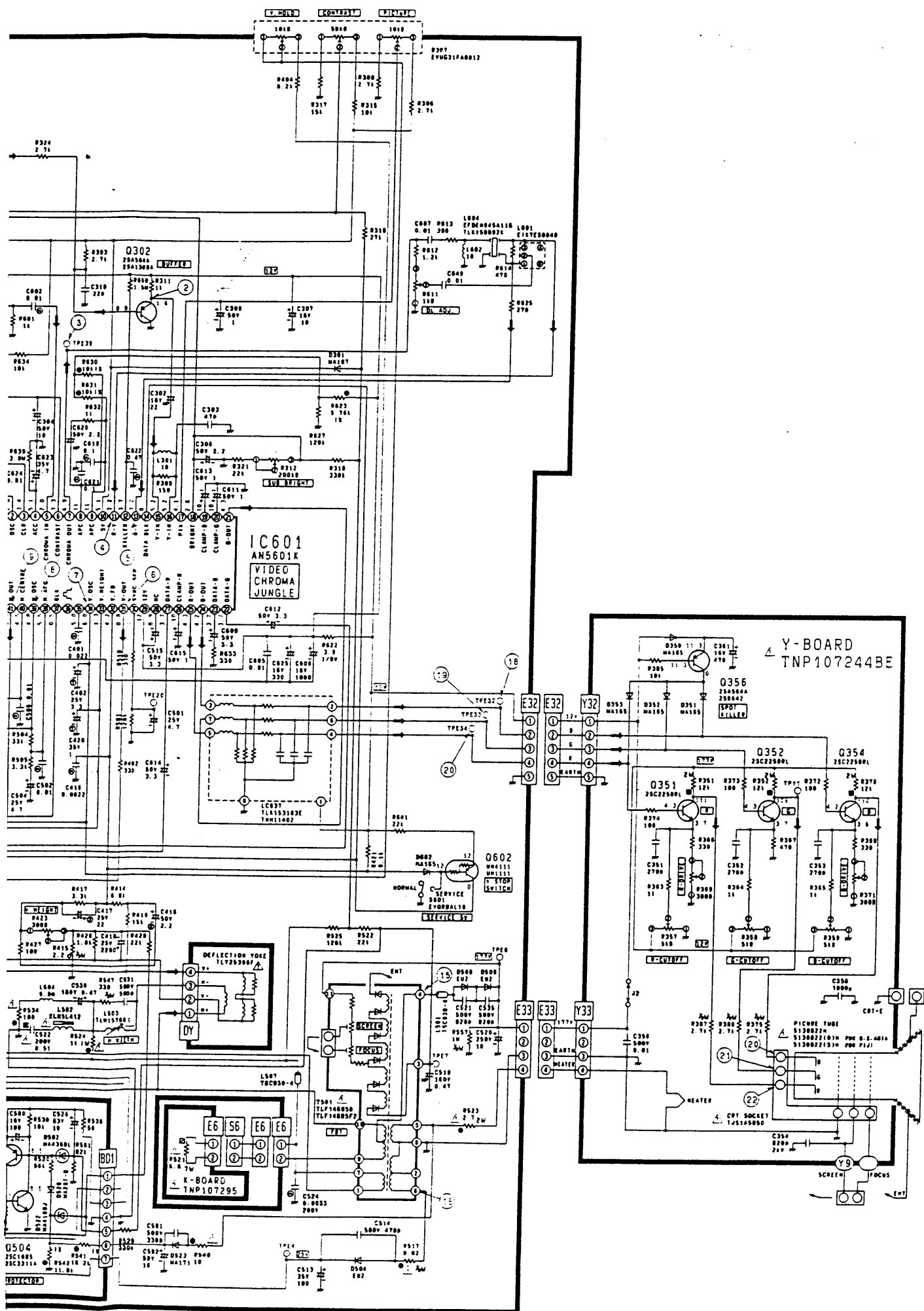
IC801  
STR50213-M  
113V AVR

IC401  
AN5521  
V. OUT

MB-BOARD  
TNP107431

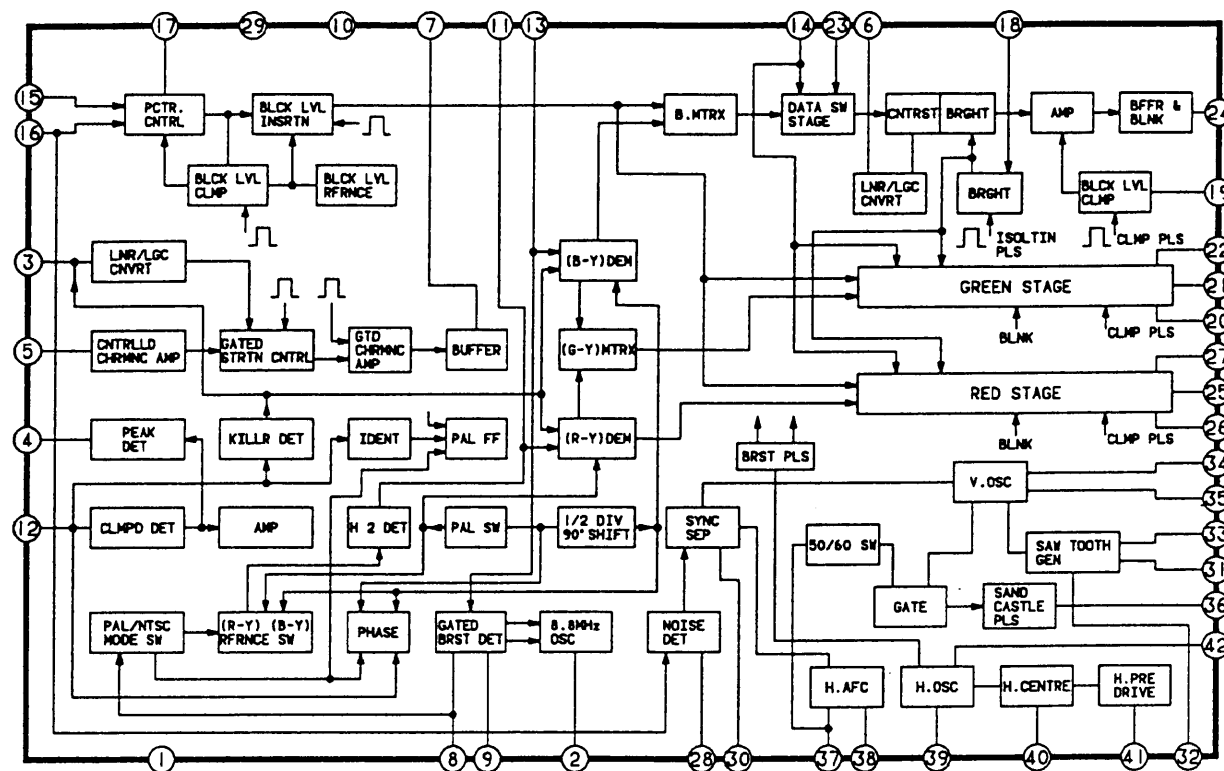
N-BOARD  
TNP107297AA

BD-BOARD  
TNP107433



## BLOCK DIAGRAM FOR INTEGRATED CIRCUIT

IC601 AN5601K



## ADJUSTMENTS

| ITEM / PREPARATION                                                                                                                                                | ADJUSTMENT PROCEDURE                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>B VOLTAGE</b><br>1. Operate the TV set.<br>2. Set controls :<br>Screen ( on FBT ) ..... minimum<br>Contrast ..... minimum<br>Colour ..... minimum              | 1. Confirm that the indicated test points for the specified voltage.<br>TPE1 : $113 \pm 2.0$ V      Pin 1 of E33 : $177 \pm 15$ V<br>TPE2 : $12 \pm 1.0$ V      TPE51 : $4.7 \pm 0.5$ V<br>TPE3 : $17 \pm 2.0$ V      TPE52 : $5.0 \pm 0.5$ V<br>TPE4 : $25 \pm 1.5$ V |
| <b>RF AGC</b><br>1. Receive a colour bar pattern.<br>2. Set the input level to $63 \pm 2$ dB. ( 75Ω opened )<br>3. Connect an oscilloscope to TPE12 with DC mode. | 1. Turn RF AGC control ( R108 ) fully clockwise.<br>2. Slowly turn RF AGC control counterclockwise to set it at the point just before voltage at TPE12 drops.<br>3. Increase the input level by 2 dB and confirm that the voltage changes.                             |
| <b>HIGH VOLTAGE</b><br>1. Operate the TV set.<br>2. Set controls :<br>Screen ( on FBT ) ..... minimum<br>Contrast ..... minimum<br>Colour ..... minimum           | 1. Connect a DC voltmeter to TPE1 and confirm the voltage is $113 \pm 2.0$ V.<br>2. Connect a high voltage meter ( Resistor type ) to an anode of the picture tube.<br>3. Confirm that the high voltage is within a range of $24.5 ( +1.5, -1.3 )$ kV.                 |

| ITEM / PREPARATION                                                                                                                                                                                                            | ADJUSTMENT PROCEDURE                                                                                                                                                           | WAVEFORM      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>SUB CONTRAST</b><br>1. Receive a colour bar pattern.<br>2. Connect an oscilloscope to TPE32.<br>3. Connect a short jumper between TPE7 and TPE52.<br>4. Set Colour control to Normal and Contrast control to Max.          | 1. Adjust Sub Bright, Screen and Bright controls :<br>$0.5 \pm 0.5$ V<br>2. Adjust Sub Contrast control ( R302 ) :<br>$3.5 \pm 0.1$ V<br>( Waveform should not be saturated. ) | <p>Fig. 3</p> |
| <b>COLOUR PHASE</b><br>1. Receive a colour bar pattern.<br>2. Connect an oscilloscope to TPE32.<br>3. Connect a short jumper between Pin-8 and Pin-9 of IC601.<br>4. Connect a short jumper between Pin-3 of IC601 and TPE52. | 1. Set Colour control to Normal and Contrast control to Max.<br>2. Adjust APC trimmer ( C617 ) to obtain synchronous waveform.                                                 | <p>Fig. 4</p> |
| <b>DELAY LINE</b><br>1. Receive a colour bar pattern.<br>2. Connect an oscilloscope to TPE32.<br>3. Set Colour control to Normal and Contrast control to Max.                                                                 | 1. Adjust the position ( A ) shown in Fig. 5 to zero level by R611.<br>2. Minimize the differences ( B ) shown in Fig. 5 by L601.                                              | <p>Fig. 5</p> |

| ITEM / PREPARATION                                                                                                                                                                                                    | ADJUSTMENT PROCEDURE                                                                                                                                                                                                                           | WAVEFORM      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>COLOUR OUTPUT</b><br>1. Receive a colour bar pattern.<br>2. Connect an oscilloscope to TPE32.<br>3. Set Colour control to Normal and Contrast control to Max.<br>4. Connect a short jumper between TPE7 and TPE52. | 1. Adjust Sub Bright, Screen and Bright controls :<br>$0.5 \pm 0.5$ V<br>2. Adjust Sub Colour control ( R620 ) :<br>$2.4 \pm 0.2$ V<br>3. Connect the oscilloscope to TPE34.<br>4. Confirm that the amplitude of waveform :<br>$3.5 \pm 0.4$ V | <p>Fig. 6</p> |

SCHEMATIC DIAGRAM FOR MODEL  
TC - 2091MR ( M15L CHASSIS )

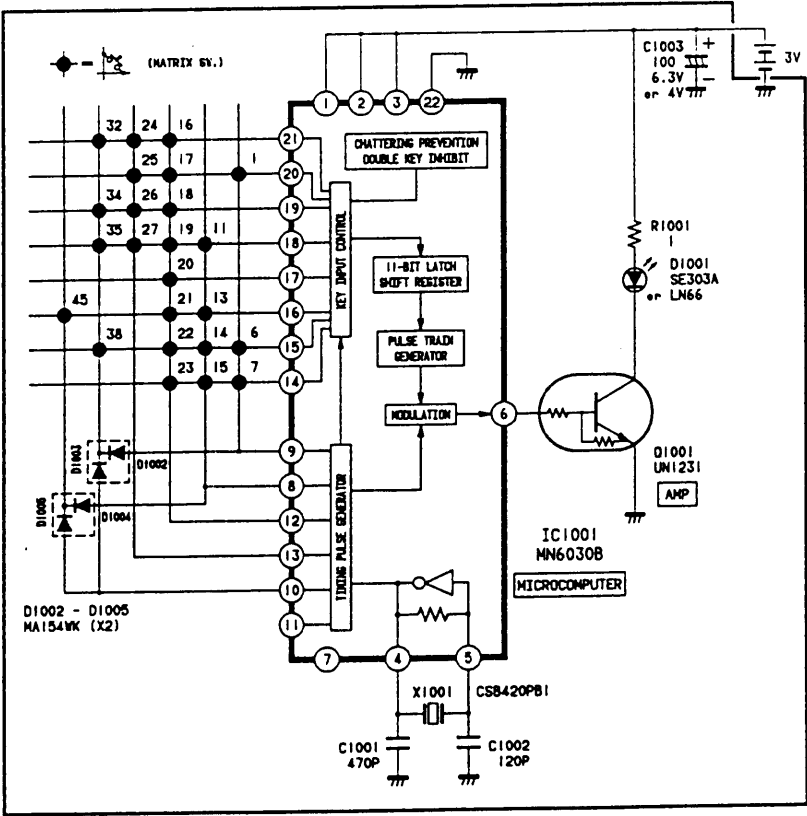
IMPORTANT SAFETY NOTICE

Components identified by  $\Delta$  mark have special characteristics important for safety.  
When replacing any of these components, use only manufacturer's specified parts.

- NOTES :
1. RESISTOR  
All resistors are carbon 1/4W resistor, unless marked as follows:  
Unit of resistance is OHM [  $\Omega$  ] ( K = 1,000 , M = 1,000,000 ).  
○ : Nonflammable       $\boxtimes$  : Metal Oxide  
 $\Delta$  : Solid       $\odot$  : Metal Film  
 $\boxdot$  : Wire Wound       $\otimes$  : Fuse
2. CAPACITOR  
All capacitors are ceramic 50V capacitor, unless marked as follows:  
Unit of capacitance is  $\mu$ F, unless otherwise noted.  
 $\otimes$  : Temperature Compensation       $\text{+} \text{H}$  : Electrolytic  
 $\text{M}$  : Polyester       $\text{NP}$  : Bipolar  
 $\text{M}$  : Metalized Polyester       $\text{T}$  : Dipped Tantalum  
 $\boxtimes$  : Polypropylene       $\text{Z}$  : Z - Type
3. COIL  
Unit of inductance is  $\mu$ H, unless otherwise noted.
4. TEST POINT  
 $\circ$  : Test Point position
5. VOLTAGE MEASUREMENT  
Voltage is measured by a DC voltmeter.  
Conditions of the measurement are the following:  
Power Source ..... AC 220 V, 50 Hz  
Receiving Signal ..... Colour Bar signal (RF)  
All customer's controls ..... Maximum position
6. Number in red circle indicates waveform number.  
( See waveform pattern table. )
7. When arrow mark (  $\nearrow$  ) is found, connection is easily found from the direction of arrow.
8.  $\Rightarrow$  : Indicates the major signal flow.
9. This schematic diagram is the latest at the time of printing and subject to change without notice.

Remote Control Transmitter EUR64531

| Key Function Table |           |                       |         |           |                       |
|--------------------|-----------|-----------------------|---------|-----------|-----------------------|
| KEY NO.            | DATA CODE | FUNCTION TV (CODE,00) | KEY NO. | DATA CODE | FUNCTION TV (CODE,00) |
| 1                  | 01        | VOL +                 | 21      | 15        | 6                     |
| 6                  | 06        | BRIGHT +              | 22      | 16        | 7                     |
| 7                  | 07        | NORMAL                | 23      | 17        | 8                     |
| 11                 | 08        | MUTE                  | 24      | 18        | 9                     |
| 12                 | 0C        | COLOUR +              | 25      | 19        | 10                    |
| 13                 | 0D        | VOL -                 | 26      | 1A        | 11                    |
| 14                 | 0E        | COLOUR -              | 27      | 1B        | 12                    |
| 15                 | 0F        | BRIGHT -              | 32      | 20        | POWER                 |
| 16                 | 10        | 1                     | 34      | 22        | PROG. UP              |
| 17                 | 11        | 2                     | 35      | 23        | PROG. DN              |
| 18                 | 12        | 3                     | 38      | 26        | RECALL                |
| 19                 | 13        | 4                     | 45      | 2D        | OFF TIMER             |
| 20                 | 14        | 5                     |         |           |                       |



WAVEFORM PATTERN TABLE

