

# Code Master



**Model CWR-610E**

**OPERATING INSTRUCTIONS**

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## RATING

### 1. Reception codes

CW - Morse                    Alphabet, numerals, symbols, special codes.

RTTY Baudot code    5-unit Baudot code (CCITT No. 2):  
1 start bit, 5 code bits, 1.5 stop bits. Total 7.5 bits.

ASCII code            7-unit ASCII code (ISO/CCITT No. 5):  
1 start bit, 7 code bits, 1 parity bit, 2 stop bits. Total 11 bits.

### 2. Inputs

AF input                    Input impedance 600 ohms (usable within 8 ohms to 100 ohms)  
30 mV to 2 V rms.

TTL input

Baudot, ASCII            TTL-level mark = L, space = H  
RS-232C mark = -5 V to -15 V, space = +5 V to +15 V  
(Reversible by internal selection).

CW                            Mark = L

### 3. AF frequency            800 Hz, active filter + PLL filter.

CW                            Mark demodulation system.

RTTY                        Mark demodulation single side system (changeable to space demodulation single side system by internal selection).

### 4. Display outputs            RF output (CCIR, European standard VHF ch. 4, 62.25 MHz) or Composite Video Signal outputs are changed over by internal selection. (Set at RF output when shipping.)

### 5. Printer interface            Centronics compatible, parallel interface built-in.

### 6. Display characters            612 characters × 2 pages; total 1,224 characters (maximum effective number of characters being received is 971).

### 7. Decoding speed

CW                            3 wpm to 40 wpm; automatic follow-up.

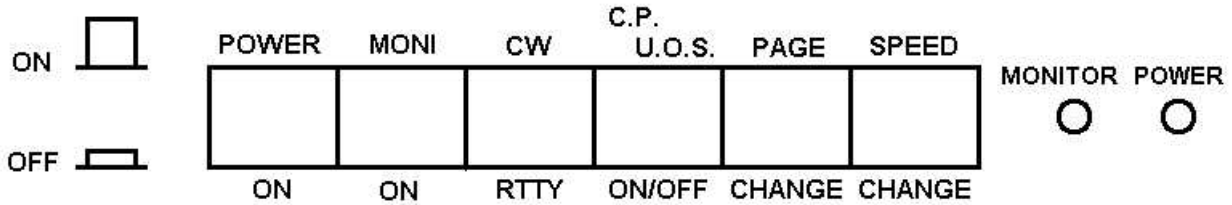
RTTY                        Baudot            45.45, 50, 56.88 74.2 baud  
ASCII                110, 300, 600 baud

(Since the built-in demodulator does not operate on 300 baud or 600 bauds, feed signals of TTL level or RS-232C level from TTL-IN.)

8. CW random generator (Code Practice = CP generator)
- |                |                       |
|----------------|-----------------------|
| Produced codes | Alphabet and numerals |
| Speed          | 2 wpm to 30 wpm       |
9. Power source DC 12 V, 700 mA (usable in DC 10 V to 13.8 V)
10. Overall dimensions 160 mm wide × 205 mm deep × 50 mm high.
11. Weight 1.1 kg
12. Accessories
- 2 earphone plugs
  - 1 fuse (1 A)
  - 1 cable with earphone plugs

## DESCRIPTION OF PANELS

### FRONT PANEL



POWER      Power switch

MONI      Monitor sound ON/OFF switch, and also used as CP start prohibition switch. Only when the switch is in ON position, monitor sound is oscillated. When the switch is turned OFF, in CP mode, only the random number display characters are updated and operation is not started; in CW mode, on the other hand, the character space judging time is shortened and the cursor moving speed is accelerated.

CW / RTTY      The selector for CW and RTTY

CP UOS      In CW mode, when the switch is pressed, the screen shows CP. At this time, if MONI switch is turned on, the CP generator starts up. When this switch is pressed while the CP generator is operating, its operation is temporarily stopped. When pressed again, the operation is resumed from the interrupted point.  
In Baudot mode, when this switch is pressed, the UOS is turned on, and when pressed again, it is turned off.

PAGE      The screen changing switch; the pages are changed alternately at every press on the button.

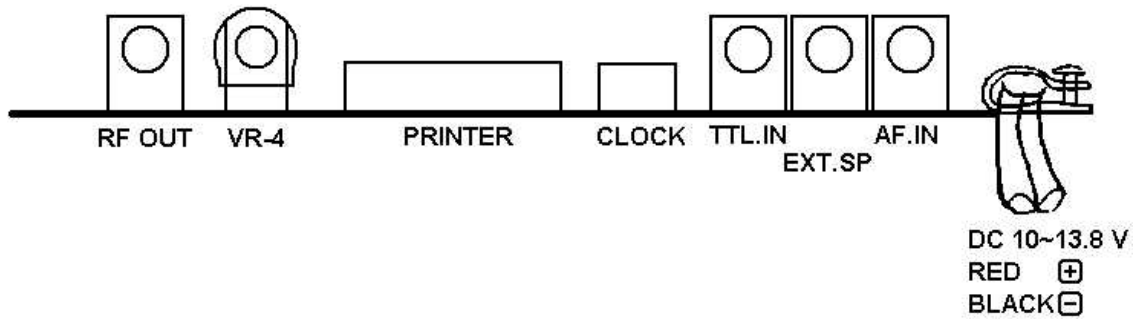
SPEED RTTY      By every press on the button, the baud rate steps up from 45.45 to 600 bauds. Depending on the baud rate being used, the Baudot code and ASCII code are automatically changed over. (That is 45.45, 50, 56.88, 74 bauds are Baudot; 110, 300, 600 bauds are ASCII.)

While in CP mode, by every press on the button, the CP generator speed is changed from 2 wpm to 30 wpm, one step is 1 wpm, from 12 to 30 wpm, one step is 2 wpm and 30 wpm is followed by 2 wpm.

MONITOR LED      It flickers when receiving CW, RTTY or while CP is operating.

POWER LED      Lights up when power is turned on.

## REAR PANEL



- RF OUT For connection with antenna input terminal of home TV.  
When changed to VIDEO OUT inside, this terminal is used to connect with monitor TV.
- VR-4 This is used to adjust the clock frequency for baud rate to 4,800 Hz in RTTY. It has been correctly adjusted before shipping and should not be turned except when readjusting. (The frequency is always 4,800 Hz from 45.45 to 600 bauds.)
- PRINTER Centronics compatible printer data output terminals, from which parallel 7 bit ASCII codes are delivered.  
ASCII function code with reference to only LF is delivered, all other function codes than CR, NUL, DEL are ignored. Select a printer which incorporated buffer register for one-line portion, and automatically feeds line when this buffer register becomes full, and also feed line when control code 0A (LF: line feed coder) is entered.
- CLOCK The terminal for checking or taking off clock 4,800 Hz for baud rate. (It can be converted to a terminal to deliver the output of built-in demodulator at TTL level by changing over inside the PCB.)
- TTL. IN TTL input terminal of RTTY when using external demodulator. TTL level signal (or RS-232C level) is fed to this terminal.  
Mark L, space H. (Mark  $-5 \sim -15$  V, space  $+5 \sim +15$  V.)  
CW: Connects to HAND KEY.
- EXT. SP Connects earphone or speaker.
- AF. IN Connects to external speaker head phone terminal of transceiver, etc.

## METHOD OF USE

### Preparation

When connecting with a transceiver, arrange so that the case side of this unit and that of the transceiver may be at the same potential.

Connect the AF. IN terminal on the rear panel with the external speaker terminal of the transceiver. Connect from the RF. OUT to the VHF ANT terminal of the television set. Connect an earphone or a speaker to EXT. SP terminal.

### Reception of CW

- a. Set the CW/RTTY selector to CW mode. (Switch is off.)
- b. Control the sound volume of reception by turning the AF knob on the transceiver.
- c. Turn on the POWER switch.

The the cursor is displayed in the upper part of the left side of the screen. At this time, the following message is displayed in the bottom line of the screen: **<Morse Code>**

- d. Since the AF input selection of this unit is adjusted to center frequency of 800 Hz, when the reception sound is adjusted to 800 Hz by turning the main dial of the transceiver, RIT or clarifier control knob, the MONITOR LED flickers in response to the signal.
- e. When the first page is filled with 567 characters or more, the text is transferred to the second page from the first character. Therefore, to look for previous characters, press the PAGE button. (5 lines are repeated)  
When the PAGE button is depressed, the display returns to the first page.

### CODE INTERPRETABLE RANGE AND WORD SPACE

Codes generally consists of dots of 1 length unit and dashes of 3 length units. This machine can distinguish dashes of 2 to 4 length units for dots of 1 length unit. So, a dash shorter than 2 length units is regarded as a dot, and a corresponding character is displayed.

Example:

·-	·-
1:3	1:1.9
A	I

If a dash is longer than 4 length units, its code is interpreted, but since the calculation standard speed regards it as a slow code, the next code may be interpreted by mistake.

However, since the standard speed is always calculating the average of codes for 8 preceding characters, the interpretation is not disturbed by mixture of one or two characters.

- The standard word space is 7 dots. This machine assumes a word space when no code comes in for two-dot length after a character portion is provided.
- This machine displays an underline when an uninterpretable code is fed.
- When a consecutive signal longer than 8 bits is fed, the signal is divided by 8 bits each, and corresponding characters are displayed.

- The correspondence between the display characters and the telegraph codes is shown in the attached sheet.

## Reception of RTTY

Since the unit incorporates a PLL system one side demodulator, it can receive commercial, meteorological and amateur communication with a certain signal intensity.

- When an optional terminal unit is connected by using external input terminal (TTL. IN), the unit can be upgraded to the maximum functional state.

Set the switches as follows:

CW/RTTY selector: RTTY (Switch is ON)

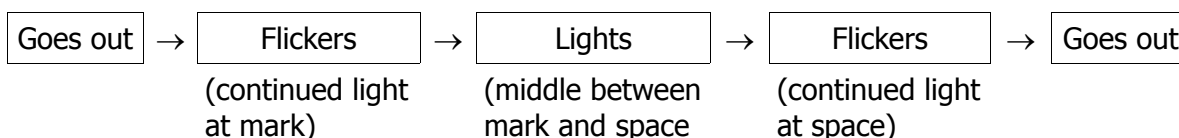
At this time, the following message is displayed in the bottom line of the screen:

<Baudot Code> LTR UOS-OFF 45 Baud

### HF band (Mode set LSB)

Turn the reception dial of the transceiver, RIT or clarifier and adjust so that the MONITOR LED flickers when receiving a mark. In 170 Hz shift, the flickering of LED varies as shown below, so that critical adjustment is necessary.

When the dial is turned gradually from the low beat pitch side to the high pitch side and MONITOR LED changes thus:



Adjust to the first flickering point. If characters are not displayed normally through fine adjustment (only numerals and symbol are displayed and characters do not appear), press the CASE button.

Or, if the characters are not displayed normally, it is also probable that the shift may be reverse. Adjust to the latter flickering point.

It must be noted that when the shift width is more than 170 Hz, the LED flickers at two positions according to the shift width but does not light in the middle point.

### VHF band

Since the VHF band is shifted in the reverse direction of the HF band, reception to USB.

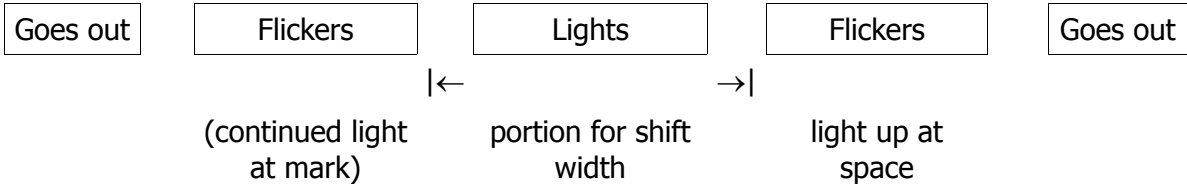
- The baud rate of this set is adjusted to 45.45 bauds, and signals of different baud rate cannot be interpreted. For the procedure of changing the baud rate, refer to the section on the adjustment.
- If the frequency cannot be adjusted because of the selection type dial, adjust the frequency of the internal demodulator according to the procedure of adjustment given below.



**Reception of commercial station**

Since the transmission speed of a commercial station is usually 50 bauds, adjust the speed according to the section of the adjustment.

The shift width is normally more than 170 Hz, and the MONITOR LED lights up from the low beat pitch side as shown below:



Since this set is of single side system, it can be used regardless of the shift width.

Turn the dial of the receiver to adjust to the first flickering point.

RTTY exclusive use switch

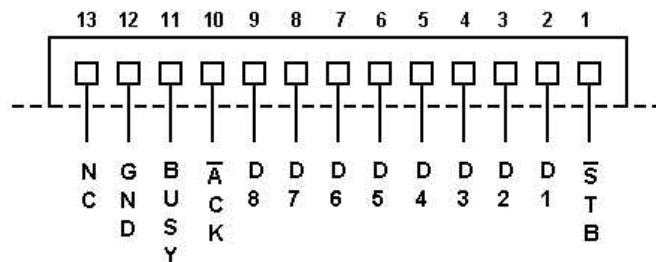
U.O.S. Unshift on-space (After receiving a space signal, the set automatically returns to the lower case (character side).

If LTR signal is likely to skip due to interference or QSB, when this switch is turned on, the set changes to the character side when a space signal is fed.

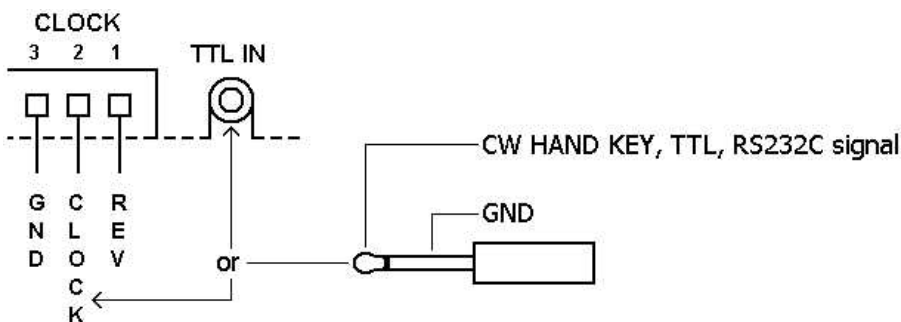
**CONNECTABLE PRINTERS**

Any printer of Centronics compatible parallel interface specification can be connected to this set.

The connector signals names for the printer in this set are as follows. Connect the printer by matching the signal names.



Connection of external terminals or CW HAND KEY



## CONNECTION OF EXTERNAL TERMINALS OR CW HAND KEY

1. Feed the output of external demodulator into TTL IN terminal at RS-232C level by using ear-phone plug.  
When the Output of external demodulator is at TTL level, cut the [Cut land REV].
2. When changing the CLOCK OUT pin for TTL OUT, refer to the description of adjustment and checking.
3. To control normal/reverse selection from outside, refer also to the section on changeover, adjustment.

## INTERNAL ADJUSTMENT, CHANGEOVER ADJUSTMENT

### ADJUSTMENT

- Change of input frequency

It is adjusted to 800 Hz at the time of shipping. If changing is necessary in relation to filter or monitor sound, adjustment of about plus 500 Hz or minus 100 Hz is possible by turning the VR.

1. Feed a new frequency from AF. IN terminal
2. Turn [VR2] until the maximum output is delivered to [TP2] on oscilloscope.
3. Stop input from AF. IN.
4. Connect frequency counter or oscilloscope to [TP3] and turn [VR3] until the reading coincides with the new frequency.

- Readjustment of baud rate clock

Connect frequency counter and oscilloscope to pin 2 of clock terminal, and adjust [VR4] to set 4,800 Hz.

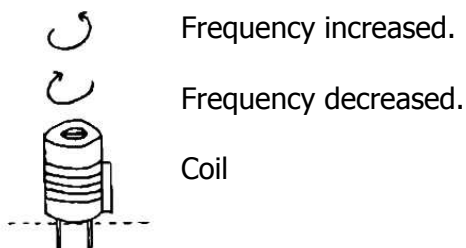
- The clock of 4,800 Hz is used throughout 45.45 to 600 bauds.

It must be noted therefore that if this clock frequency is deviated, all baud rates go wrong. Also note that the baud rate indication on the screen does not change even if the clock frequency is varied.

- A 16-fold value of desired baud rate is equal to the clock frequency.
- Use up 100 bauds with external MODEM. The unit can operate in up to 600 bauds by using external clock and TTL IN.

- Adjust of RF OUT frequency

This set is adjusted according to the CCIR European standard VHF ch 4 (62.25 MHz). If fine adjustment is necessary, turn the core of RF coil.



- In the Australian specifications, the set is adjusted to VHF ch 1 (57.25 MHz)

## **CHANGEOVER**

### Changing method when using video monitor TV instead of home TV

Changing from RF OUT to VIDEO OUT

Cut and bridge with solder at two positions:

1. RF OUT selector part: Cut "R" - short "V".
2. RF converter part: Cut "RF -VIO".

Cut and short correctly by referring to the parts layout chart.

VIDEO OUT specification

Composite video signals (video normal modulation, synchronous negative modulation,  $1.0 \pm 0.2 V_{PP}$ , 75 ohms).

### Initial start changeover of Baudot, ASCII

The set is initially set to start in Baudot at the time of shipping. To start in ASCII, however, bridge the [MODE SEL A] with solder.

At this time, the following message is displayed in the bottom line of the screen:

```
<ASCII Code>      110 Baud
```

### Changeover of display output CCIR system and NTSC system

The system is set to CCIR at the time of shipping. It can be changed to NTSC as necessary.

In this case, short the MODE SEL B [bridge land B] with solder.

### Normal/reverse selection

The input of Baudot and ASCII is set at mark L at the time of shipping. It can be changed to mark H.

Cut the MODE SEL REV [cut land REV].

To control normal/reverse selection from outside, provide a switch between clock terminals 1 and 3.

When the [cut land REV] is cut, the operation is changed as follows:

The internal demodulator becomes a space demodulator. The TTL. IN is changed to mark H, space L input.

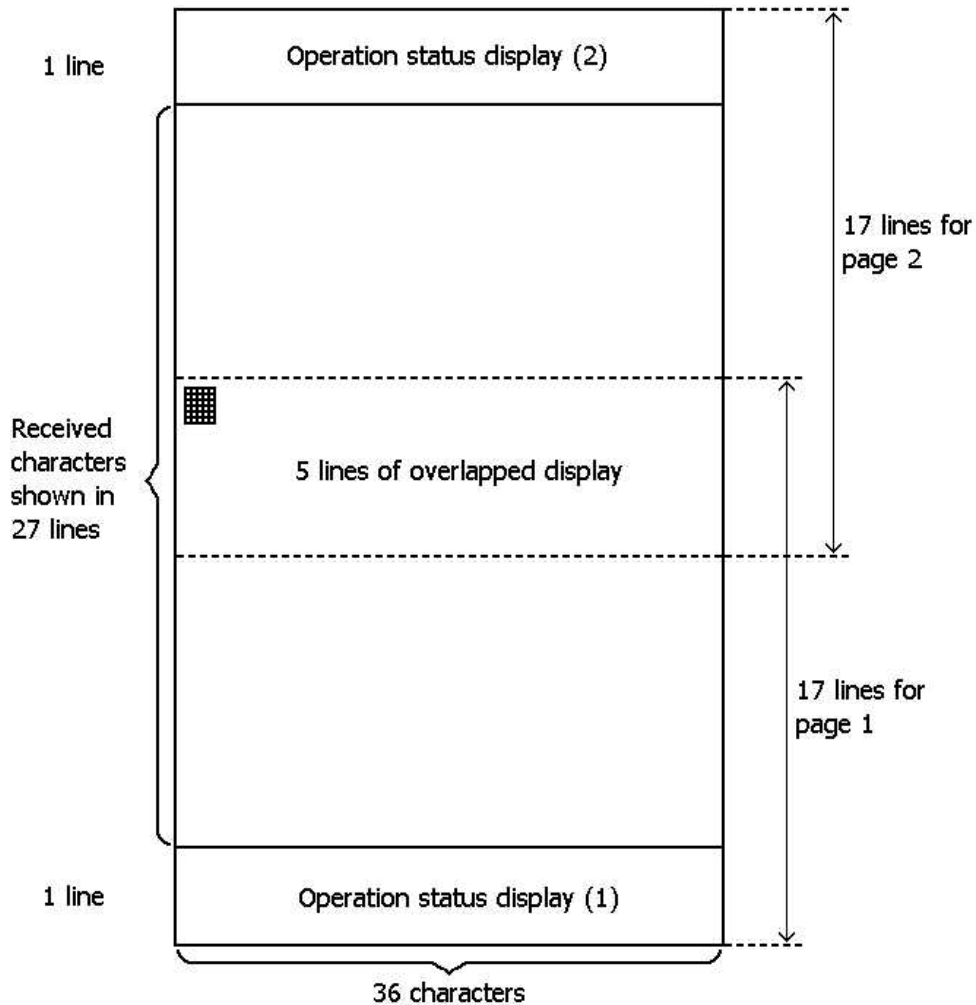
When changing CLOCK terminal to TTL OUT terminal:

Cut the [CUT land CLOCK] and bridge the [Bridge land TTL OUT] with solder.

When thus changed over, pin 2 of clock terminal delivers the output of built-in demodulator and the clock output of 4,800 Hz adjusted at the time of shipping is cut off.

## DESCRIPTION OF DISPLAY SCREEN

Two screen, containing 36 characters by 17 lines each, are changed over and appear as shown below:



The following messages appear in the operation status display area:

Mode	Status display 1	Status display2
CW	<Morse Code>	<Morse Code>
Baudot	<Baudot Code> LTR UOS-OFF 45 BAUD	LTR.UOS-OFF 45 BAUD <BAUDOT Code>
ASCII	<ASCII CODE> 110 BAUD	110 BAUD <ASCII Code>

- **LTR** case is changed to **FIG** case when switch is changed to FIG.
- **UOS OFF** is changed to **UOS ON** when UOS is turned on.
- **Baudot** At 45 bauds, the baud rate changes from 45 to 50, 57 or 75 at every press on the speed button.
- **ASCII** At 110 bauds, the baud rate changes from 110 to 300 and 600 at every press on the speed button.

- Baudot and ASCII are automatically exchanged when the baud rate is changed over.

## CP (CW random generator)

Change to CP mode:

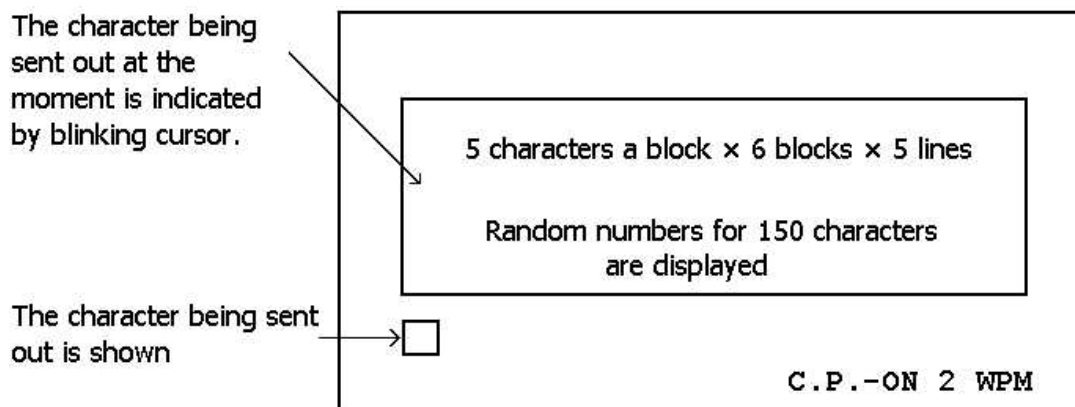
1. Push down MONI switch.
2. Turn RTTY/CW selector to CW side. The CW mode is selected.
3. Turn on power switch.
4. Push down CP UOS switch one.  
Then the CP is started at a speed of 2 wpm. Thereafter, after every press on the SPEED CASE button, the speed increases every 1 wpm from 2 to 10 wpm, and every 2 wpm from 12 to 30 wpm. Step up up to a necessary speed. When 30 blocks of five characters each are sent out, the operation stops.

When the CP UOS switch is pressed again, the display random characters are changed and the operation is started again at the preset speed.

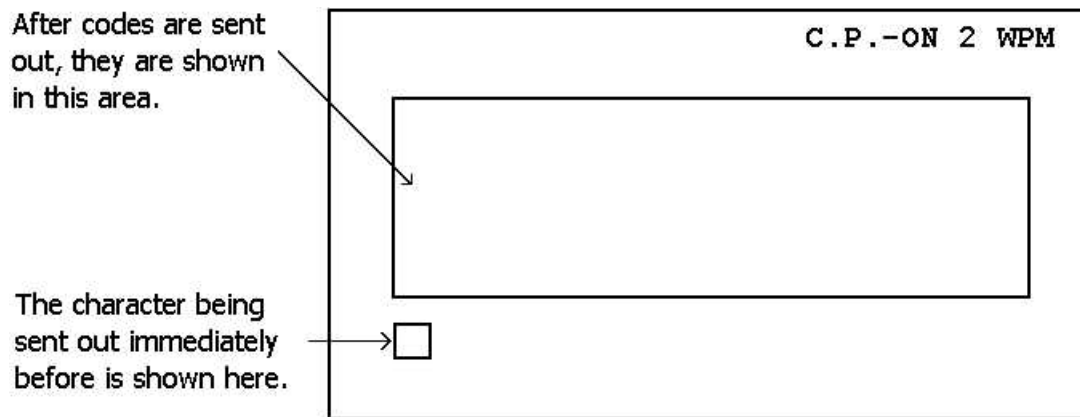
5. Turn off the power switch once, then the mode returns to CW.
- Random characters are generated in a total of 40 different kinds, consisting of numerals from 0 to 9, alphabet A to Z, period (.), comma (,) slash (/) and question mark (?). Meanwhile, letters A to Z appear at a double frequency as compared with other characters.

The screen in CP mode is displayed as follows.

Page 1 ..... In this screen, the codes can be heard while visually checking the characters being sent out.

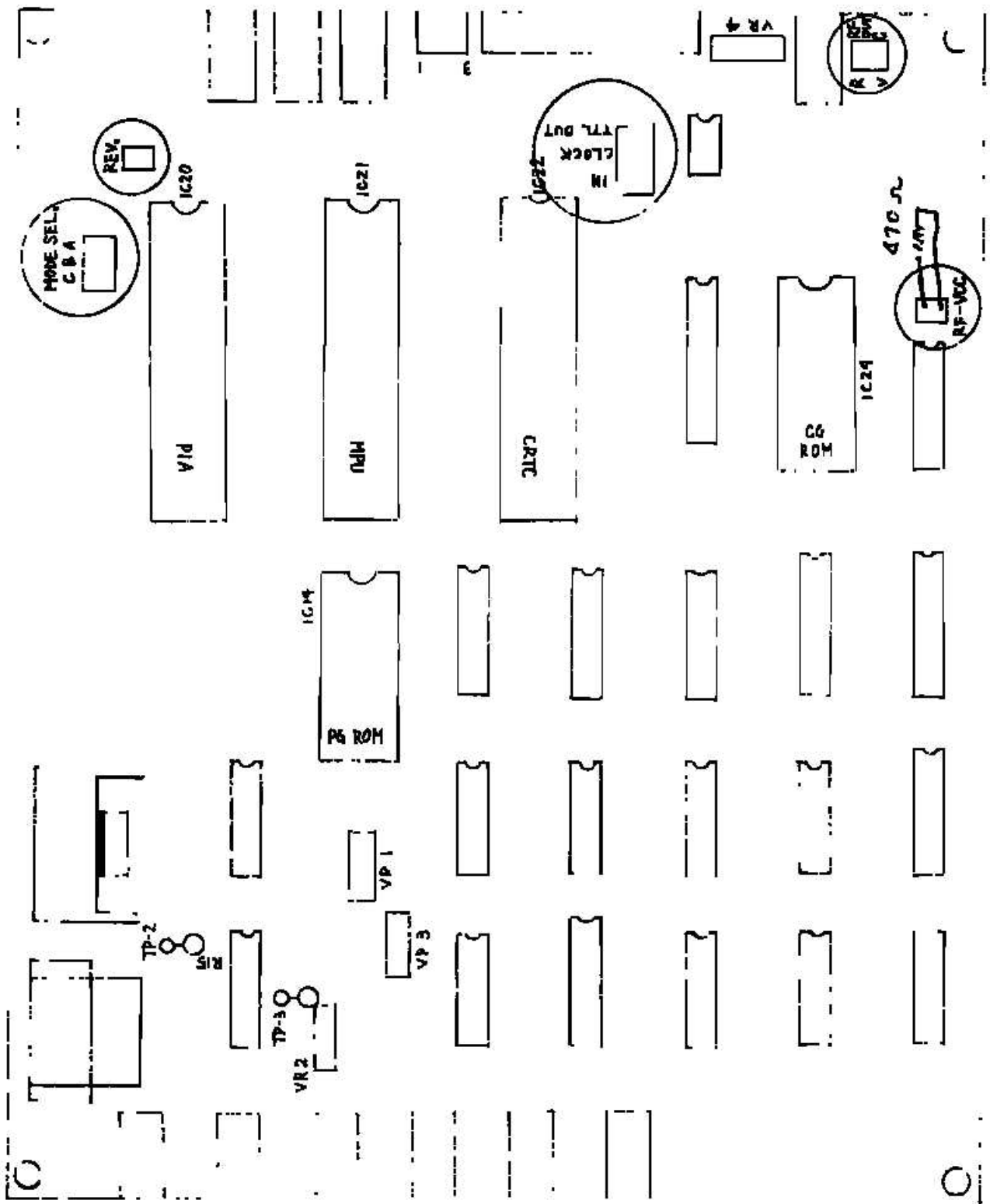


Page 2 ..... In this screen, after sending of codes, the corresponding characters are displayed.



- The wpm display changes according to the selection from 2 to 30
- CP-ON display is changed to OFF and to ON again by selection of CP UOS switch.
- Even if CP-ON, when MONI switch is turned off, only the display appears and operation is not started.

# LAYOUT OF ADJUSTING VOLUMES AND SWITCHING SPOTS





## CORRESPONDENCE CHART OF DISPLAY CHARACTERS AND CODES (CW)

<u>Display</u>	<u>Code</u>	<u>Display</u>	<u>Code</u>
A	..	.	.....- (period)
B	....	,	----..- (comma)
C	....	:	----... (colon)
D	...	?	.....
E	.	'	.....- (apostrophe)
F	....	-	.....- (dash)
G	---	(	.....
H	....	)	.....-
I	..	/	.....
J	....-	=	.....- ( <u>BT</u> )
K	..-	+	.....- ( <u>AR</u> )
L	....	"	.....- (quotation mark)
M	--	1	.....
N	..	2	.....
O	---	3	.....
P	....	4	.....-
Q	----	5	.....
R	...	6	.....
S	...	7	.....
T	-	8	.....
U	...	9	.....
V	....-	Ø	.....
W	---	!	.....- ( <u>BK</u> )
X	....-	^	.....- ( <u>AS</u> )
Y	....-	<	.....- ( <u>HH</u> )
Z	....	\$	.....- ( <u>SX</u> )
		%	.....- ( <u>CL</u> )
		[	.....- ( <u>KA</u> )
		>	.....- ( <u>VE</u> )
		@	.....- ( <u>AA</u> )
		#	.....- ( <u>HR</u> )
		LineFeed	.....- ( <u>SK</u> )

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