

TEST MODE

Test items

1. FLASH ROM check
 2. Version number check
 3. Switch and LED check
 4. LEVEL volume check
 5. GUIDE volume check
 6. DA check
 7. Output check
 8. INST volume check
 9. MIC volume check
 10. MUTE check
 11. AUX IN (NORMAL) check
 12. AUX IN (FLAT AMP SIMULATE) check
 13. AUX IN (CENTER CANCEL) check
 14. AUX IN (L ch) check
 15. CN2 solder spot check
 16. Noise check
 17. Battery operation check
- Note : Test items 7,10,15, also include a PHRASE SELECT volume check.

Items required for tests

- Oscillators x 2
- Oscilloscope
- Noise meter
- Monitor amp
- FS-5U x 2
- 1k ohm stereo short plug
- 150 ohm short plug
- 47k ohm short plug
- J-5
- Stereo mini <-> monaural phone conversion cable

Entering test mode

- Set all volumes to minimum.
- While holding down the left pedal (RECP/PLAY/OVERDUB) and right pedal (STOP/TAP/TEMPO), connect the adaptor to the ADAPTOR JACK to turn on the power.
- When only the POWER LED is lit, within two seconds press the left pedal and then the right pedal.
- You will enter Test mode, and all LEDs other than "PEAK" will either light or blink.

Note : A FLASH ROM check is automatically performed when you enter Test mode. The state of the LEDs, when you enter Test mode will depend on the result of this test. For details refer to the following item "1. FLASH check."

For details on how to skip directly to a desired test item, refer to "Skipping directly to the desired test," following the explanations of each test item.

Explanation of each test item

1. FLASH ROM check
 - Enter Test mode.
 - The FLASH ROM check will be performed when you enter Test mode.
 - If there are no problems, all LEDs other than "PEAK" will light.

If there is a problem, the state of the LEDs will indicate the problem as follows.

"OVERDUB" (yellow) blinking : MAKER ID error

"PLAY" (green) blinking : DEVICE ID error

"REC" (red) blinking : BUSY error

Note : If a problem was found, operation will stop and it will not be possible to proceed to the next step. Turn off the power to exit Test mode.

If there are any unit LEDs regardless of whether or not there was a problem, it is possible that the LED is faulty or soldered incorrectly. (With the exception of "PEAK.")

2. Version number check

- Press the right pedal.
- The internal ROM version number and the external FLASH ROM version number will be indicated by the LEDs.

Internal ROM version number display

This is indicated by the four LEDs: "FLAT AMP SIMULATE", "CENTER CANCEL", "NORMAL", and "INST & MIC".

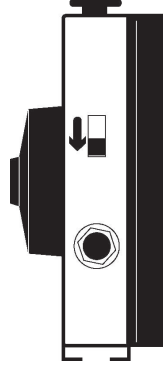
"FLAT AMP SIMULATE" only lit : Ver1.00
 "CENTER CANCEL" only lit : Ver1.01
 "NORMAL" only lit : Ver1.02
 "INST & MIC" only lit : Ver1.03

External FLASH ROM version number display

This is indicated by the following seven LEDs: "REVERSE", "TAP TEMPO", "WRITE", "EXIT", "AUTO START", "MEMORY FULL", and "LOOP QUANTIZE".

"REVERSE" only lit : Ver1.00
 "TAP TEMPO" only lit : Ver1.01
 "WRITE" only lit : Ver1.02
 "EXIT" only lit : Ver1.03
 "AUTO START" only lit : Ver1.04
 "MEMORY FULL" only lit : Ver1.05
 "LOOP QUANTIZE" only lit : Ver1.06

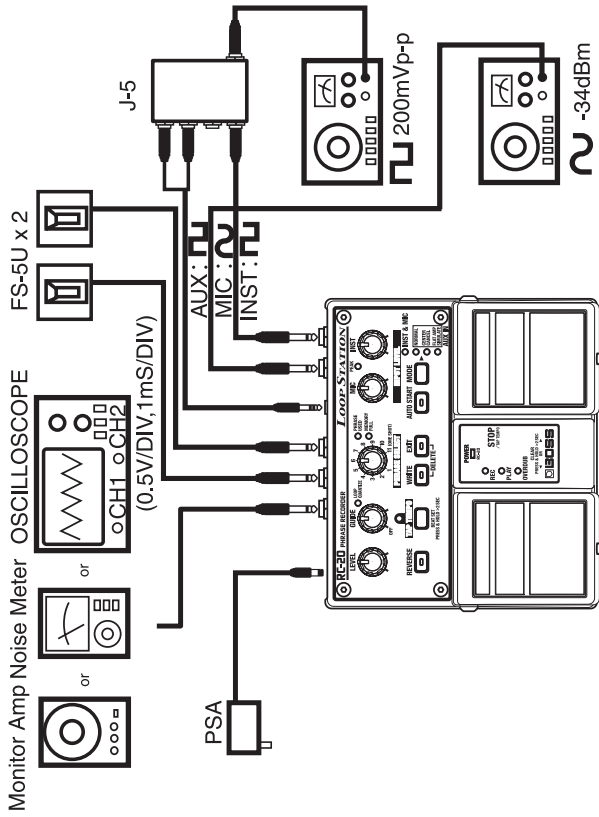
- After verifying the version, press the right pedal.
 - All LEDs other than "PEAK" will light.
- ## 3. Switches and LED check
- Connect two FS-5U units to the PHRASE SHIFT jack and REVERSE jack.
 - Set the FS-5U polarity switches to the position shown in the diagram.



- Press the REVERSE switch.
- Verify that "REVERSE", "PLAY", "OVERDUB", and "PHRASE USED" go dark, and that "TAP TEMPO" changes from orange to red.
- Press the TAP TEMPO switch, and verify that "TAP TEMPO" goes dark.
- Press the WRITE switch, and verify that "WRITE" goes dark.
- Press the EXIT switch, and verify that goes dark "EXIT".
- Press the AUTO START switch, and verify that "AUTO START" goes dark.
- Press the MODE switch, and verify that "INST & MIC", "NORMAL", "CENTER CANCEL", and "FLAT AMP SIMULATE" go dark.
- Press the FS-5U that is connected to the PHRASE SHIFT jack, and verify that "MEMORY FULL" goes dark.
- Press the FS-5U that is connected to the REVERSE jack, and verify that all LEDs other than "PEAK" light.

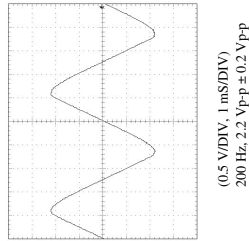
4. LEVEL volume check

- Connect your waveform measurement equipment as shown in the diagram below. Connect your oscilloscope to OUTPUT.



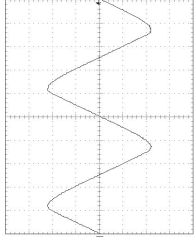
Input INST : 200Hz, square wave, 200 mVp-p
 MIC : 200 Hz, sine wave, -34 dBm
 AUX IN : 200 Hz, square wave, 200 mVp-p, STEREO

- Move the LEVEL volume to approximately the center position, and then back to the minimum position.
- Move the LEVEL volume from 'minimum' to 'maximum', and verify that the waveform increases smoothly.
- At this time, the MODE LEDs will light consecutively from "FLAT AMP SIMULATE," following the waveform.
- With the LEVEL volume at maximum, verify that the output waveform is the same as shown in the diagram.



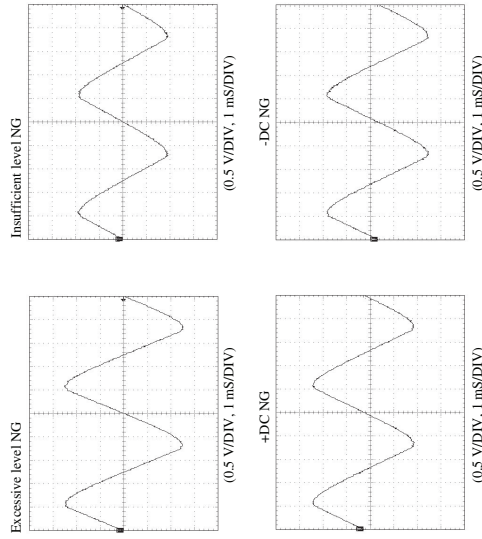
5. GUIDE volume check

- Move the GUIDE volume to approximately the center position, and then back to the minimum.
- Move the GUIDE volume from 'minimum' to 'maximum', and verify that the waveform increases smoothly.
- At this time, the MODE LEDs will change successively from "FLAT AMP SIMULATE," following the waveform.
- With the GUIDE volume at maximum, verify that the output waveform is the same as shown in the diagram.



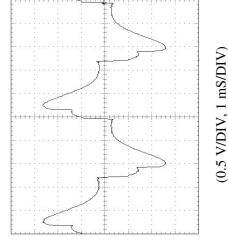
6. DA check

- Once again check the output waveform at the point that "5. GUIDE volume check" is completed, to check the DC leakage and level. In the following cases, the result is NG.



7. Output check

- Set the INST volume and MIC volume to 'maximum'.
- Set the PHRASE SELECT volume to the '2' position.
- Verify that "OVERDUB" and "REVERSE" are lit.
- Verify that the output waveform is as shown in the diagram.

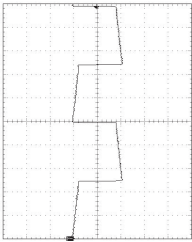


Note : The waveform will change slightly depending on the accuracy of the input function.

8. INST volume check

- Set the PHRASE SELECT volume to the '3' position.
- Verify that "REVERSE" is dark and "TAP TEMPO" is lit red.

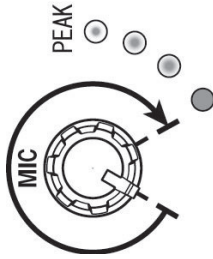
- Set the INST volume to 'minimum', and slowly move it to 'maximum'.
- Verify that the waveform increases smoothly.
- Verify that when the INST volume is at maximum, the waveform is the same as shown in the diagram.



(0.5 V/DIV, 1 mS/DIV)
1.2 Vp-p ± 0.2 Vp-p

9. MIC volume check

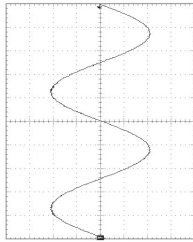
- Set the PHRASE SELECT volume to the '4' position.
- Verify that "TAP TEMPO" changes from red to green.
- Set the MIC volume to minimum, and gradually move it to maximum.
- Verify that the waveform increases smoothly.
- Verify that "PEAK" lights as shown in the diagram.



(The start illuminating of the LED indication.)

(The LED indication will stay illuminated.)

- Verify that when MIC volume is at maximum, the waveform is the same as shown in the diagram.

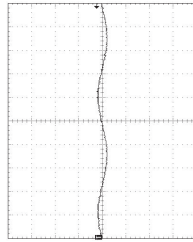


(0.5V/DIV, 1mS/DIV)

- Connect a noise meter to OUTPUT, and verify that the reading is in the range of -1.0 dBm +/- 1.5 dBm.

10. MUTE check

- Set the PHRASE SELECT volume to the '5' position.
- Verify that "TAP TEMPO" is dark and "LOOP QUANTIZE" is lit.
- Verify that the output waveform is the same as the waveform shown in the diagram.

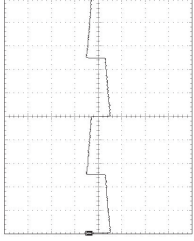


(0.5V/DIV, 1mS/DIV)

- Connect a noise meter to OUTPUT, and verify that the reading is in the range of -2.0 dBm +/- 1.5 dBm.

11. AUX IN (NORMAL) check

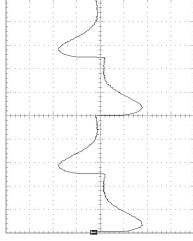
- Set the PHRASE SELECT volume to the '6' position.
- Verify that "LOOP QUANTIZE" is dark and "PHRASE USED" is lit.
- Verify that the output waveform is the same as the waveform shown in the diagram.



(0.5V/DIV, 1mS/DIV)
0.6Vp-p ± 0.1Vp-p

12. AUX IN (FLAT AMP SIMULATE) check

- Set the PHRASE SELECT volume to the '7' position.
- Verify that "PHRASE USED" is dark and "INST & MIC" is lit.
- Verify that the output waveform is the same as the waveform shown in the diagram.



(0.5V/DIV, 1mS/DIV)
2.0Vp-p ± 0.2Vp-p

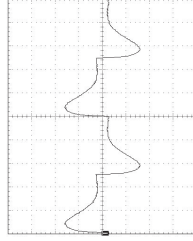
- Press the FS-5U that is connected to the REVERSE jack, and verify that the waveform does not decrease.

13. AUX IN (CENTER CANCEL) check

- Set the PHRASE SELECT volume to the '8' position.
 - Verify that "INST & MIC" is dark and "NORMAL" is lit.
 - Verify that there is no longer an output waveform.
- Note : If the waveform remains, it is possible that the CENTER CANCEL section is NG, or that there is a spot of solder on the connector.

14. AUX IN (L ch) check

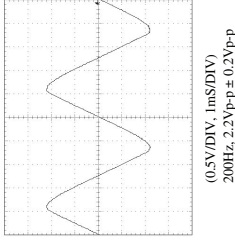
- Set the PHRASE SELECT volume to the '9' position.
 - Verify that "NORMAL" is dark and "CENTER CANCEL" is lit.
 - Input only the L channel to AUX IN.
 - Verify that the output waveform is the same as the waveform shown in the diagram.
- Note : Verify that when compared with the output waveform of "12. AUX IN (FLAT AMP SIMULATE) check," the phase is inverted.



(0.5V/DIV, 1mS/DIV)
1.8Vp-p ± 0.2Vp-p

15. CN2 solder spot check

- Set the PHRASE SELECT volume to the '10' position.
 - Verify that "CENTER CANCEL" is dark and "FLAT AMP SIMULATE" is lit.
 - Verify that there is no longer an output waveform.
- Note : If the waveform remains, it is possible that there is a spot of solder between pins 1-2 or 2-3 of CN2.
- Set the PHRASE SELECT volume to the '11' position.
 - Verify that all LEDs are lit except for "PEAK."
 - Verify that the output waveform is the same waveform as shown in the diagram.



16. Noise check

- Set the PHRASE SELECT volume to the '2' position.
- Connect a 47k ohm short plug to the INST jack, a 150k ohm short plug to the MIC jack, and a 1k ohm stereo short plug to the AUX IN jack.
- Connect a monitor amp to OUTPUT.
- Set the INST volume and MIC volume to the maximum.
- Drop the unit from a height of 10 cm, and verify that no abnormal noise is output.
- Turn the INST volume and MIC volume, and verify that no abnormal noise is output.
- With the INST volume and MIC volume at the maximum positions, measure the residual noise, and verify that it is less than -78 dBm (HF-A).

17. Battery operation check

- Put the battery in the battery compartment and insert the plug into the INPUT jack.
 - Check that power is turned on.
 - Check that the unit is operating normally.
- Note : Always check the battery after repairing or servicing the product.**

Skipping directly to the desired test

- Enter Test mode.
- The FLASH ROM check will occur automatically, and if there is no problem, all LEDs other than "PEAK" will light.
- Follow the procedure described in the section for the test you want to perform.

Note : In order to perform "5. GUIDE volume check," you must first perform "4. LEVEL volume check."

Note : Even if it is not immediately after entering Test mode, you can select the desired test item in the same way whenever all LEDs other than "PEAK" are lit.

Exiting Test mode

- Disconnect the plug from the ADAPTOR jack to turn off the power.

Cautions

After repairing or servicing the product, you must check all test items.

SERIAL DUMP AND UPDATE PROCEDURE

The following data can be transmitted and received between two RC-20 units without using any other devices.

1. Program
The operating program is stored in CPU ROM, but some processing can be altered by applying patches.
This corresponds to such patch data.
2. Guide sound
3. Phrases (1 - 11)

Procedure

1. Connect the transmitting RC-20 and the receiving RC-20 as follows.
Connect the REVERSE jack and PHRASE SHIFT jack respectively.

Transmitting RC-20 Receiving RC-20

REVERSE ----->>> PHRASE SHIFT

PHRASE SHIFT ----->>> REVERSE

2. Start up the transmitting RC-20 in Dump mode.

- 1) While holding down the [TAP TEMPO] and [AUTO START] buttons, turn on the power of the transmitting RC-20.
- 2) [EXIT] and the [FLAT AMP SIMULATE] and [REC] [PLAY] [OVERDUB] indicators will light.

3. Start up the receiving RC-20 in Update mode.

- 1) Turn the [LEVEL] knob and [GUIDE] knob all the way to the left.
- 2) Set the [PHRASE SELECT] knob to 1.
- 3) While holding down the [REVERSE] and [MODE] buttons, turn on the power of the receiving RC-20.
- 4) Within three seconds of turning on the power, press the [REVERSE] button and then the [MODE] button.
[WRITE] and the [FLAT AMP SIMULATE] and [REC] [PLAY] [OVERDUB] indicators will light.

* In Dump mode the [EXIT] indicator will light, but in Update mode the [WRITE] indicator will light.

4. Select the data that you want to send from the transmitting RC-20

- 1) Press the [TAP TEMPO] button to select the data that you want to send.

[TAP TEMPO] indicator

Dark : Program, Guide sound. All phrases

Green : Specified phrase

Red : Guide sound

Orange : Program

- 2) If the [TAP TEMPO] indicator is green, use the [PHRASE SELECT] knob to select the phrase that will be transmitted.

5. Transmit the data from the transmitting RC-20.

Transmission will begin when you press the left pedal of the transmitting RC-20.

When the [MODE] indicators of both the transmitting RC-20 and the receiving RC-20 stop at "FLAT AMP SIMULATE," transmission/reception has been completed.

* With the factory settings, transmitting the program, guide sound, and all phrases will require approximately 15 minutes.

Note : Never turn off the power until transmission/reception has been completed.

State of the transmitting RC-20

"FLAT AMP SIMULATE" Waiting to transmit

- * The RC-20 will briefly be in this state between data items.
- * Since the guide sound data is divided into two parts, the RC-20 will briefly be in this state even when transmitting only the guide sound data.

"CENTER CANCEL" Now transmitting
"NORMAL" No data for transmission

State of the receiving RC-20

"FLAT AMP SIMULATE" Waiting for reception

- * The RC-20 will briefly be in this state between data items.
- * Since the guide sound data is divided into two parts, the RC-20 will briefly be in this state even when receiving only the guide sound data.

"CENTER CANCEL" Now receiving
"NORMAL" Error

- * An error will also occur if memory becomes full.

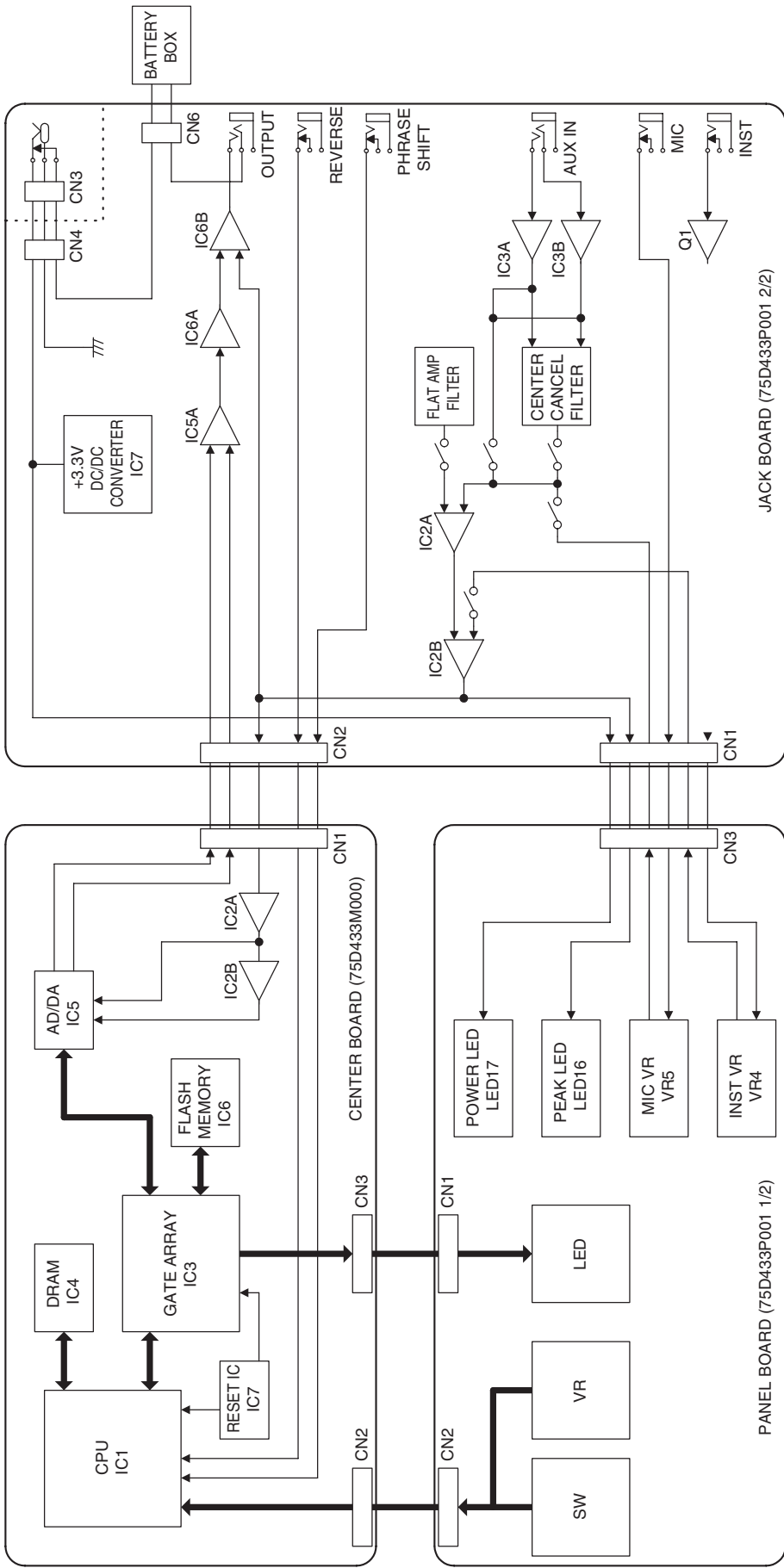
6. Repeat steps 4. -- 5. as necessary.

7. Turn off the power when you are finished.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

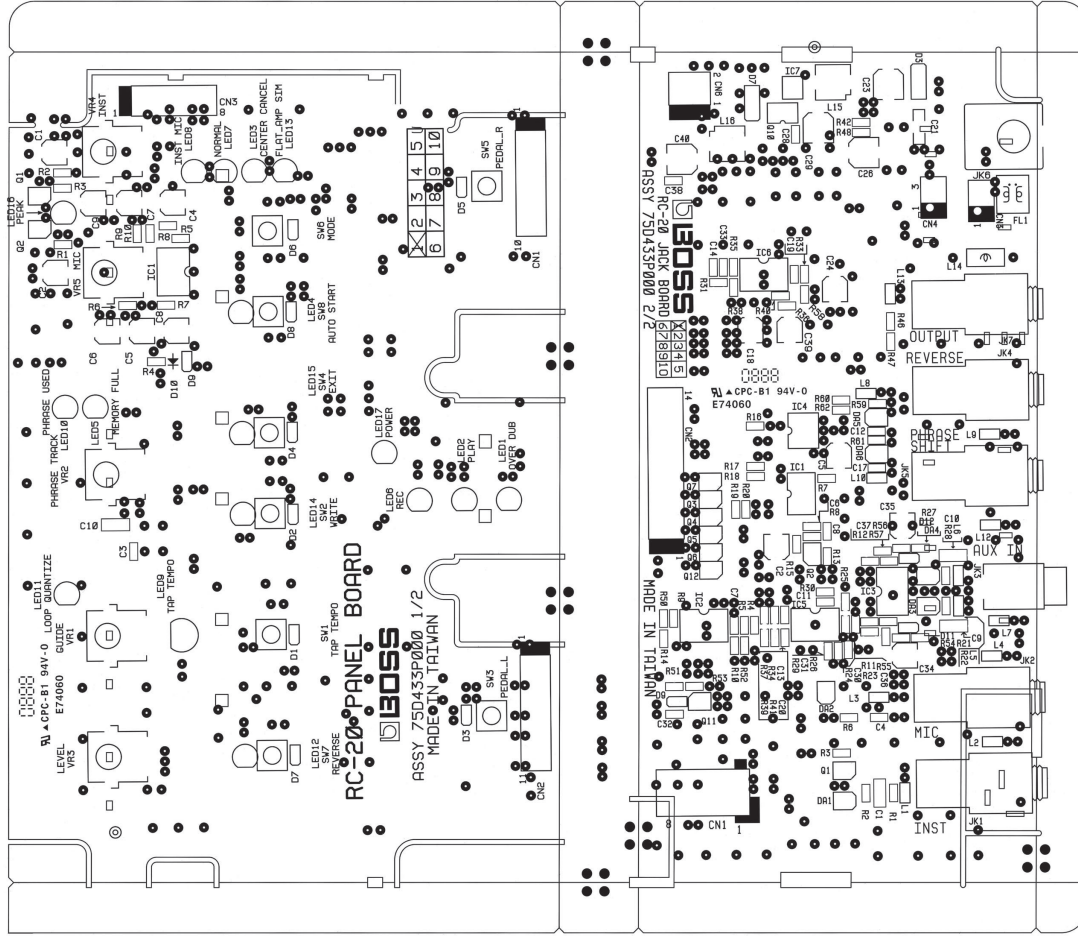
A BLOCK DIAGRAM

RC-20 Block Diagram



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (PANEL, JACK)

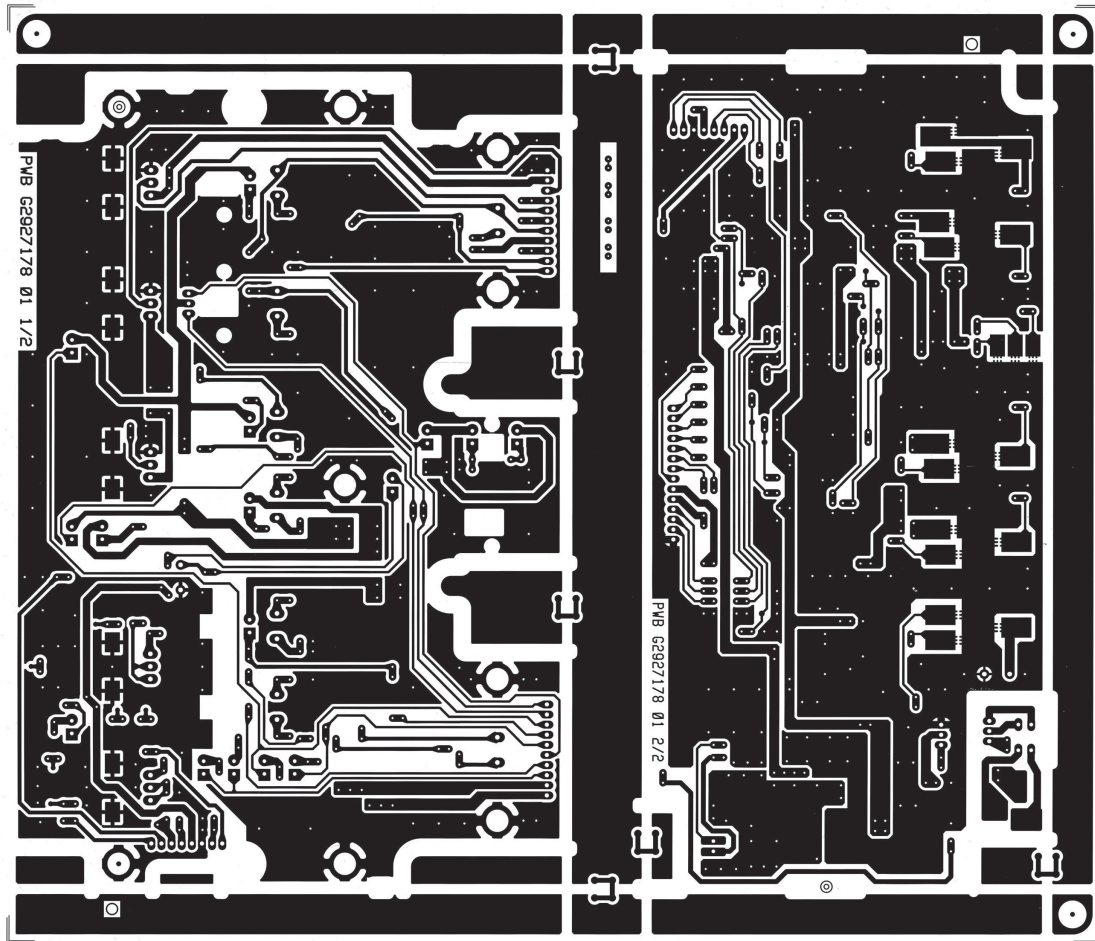


View from component side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (PANEL, JACK)

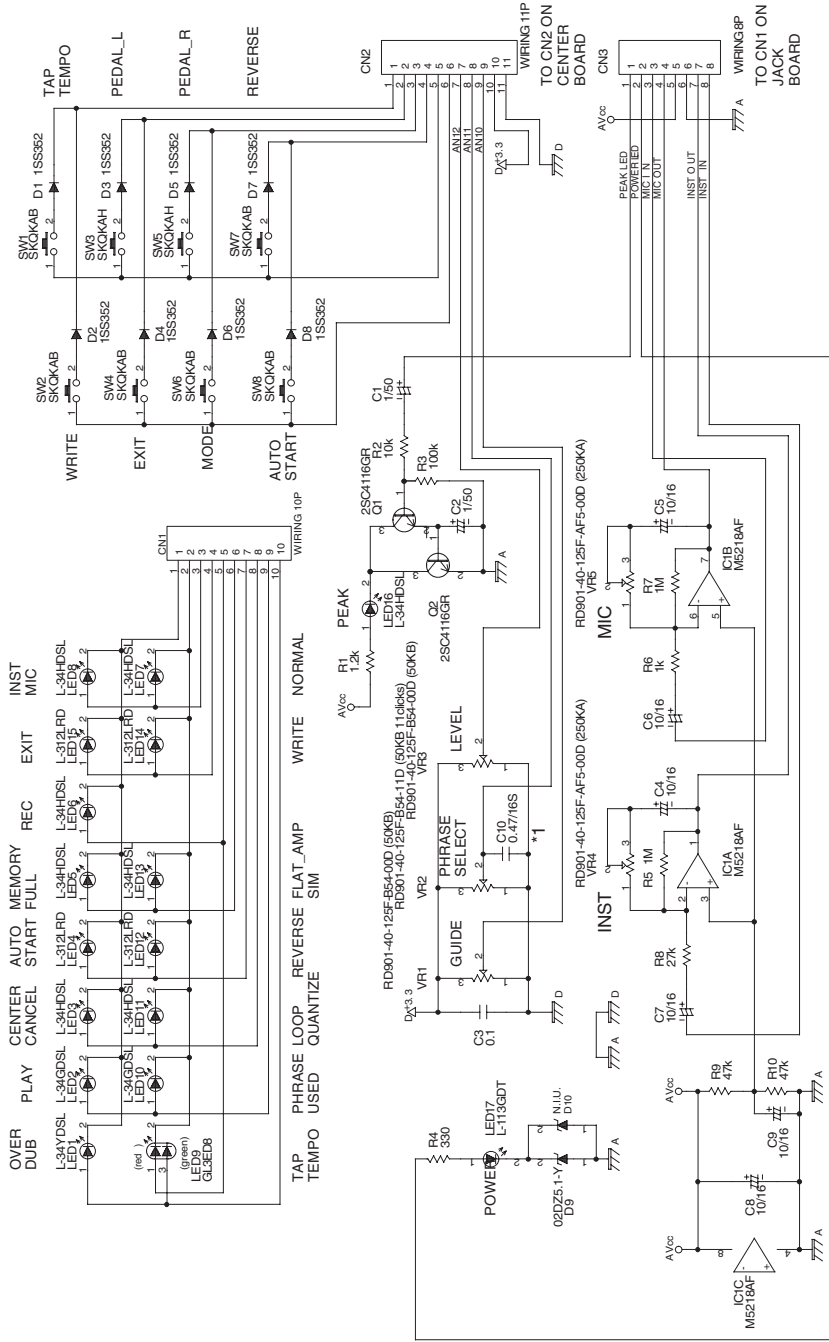
B C D E F G H I J K L M N O P Q R S T U V



View from foil side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (PANEL)

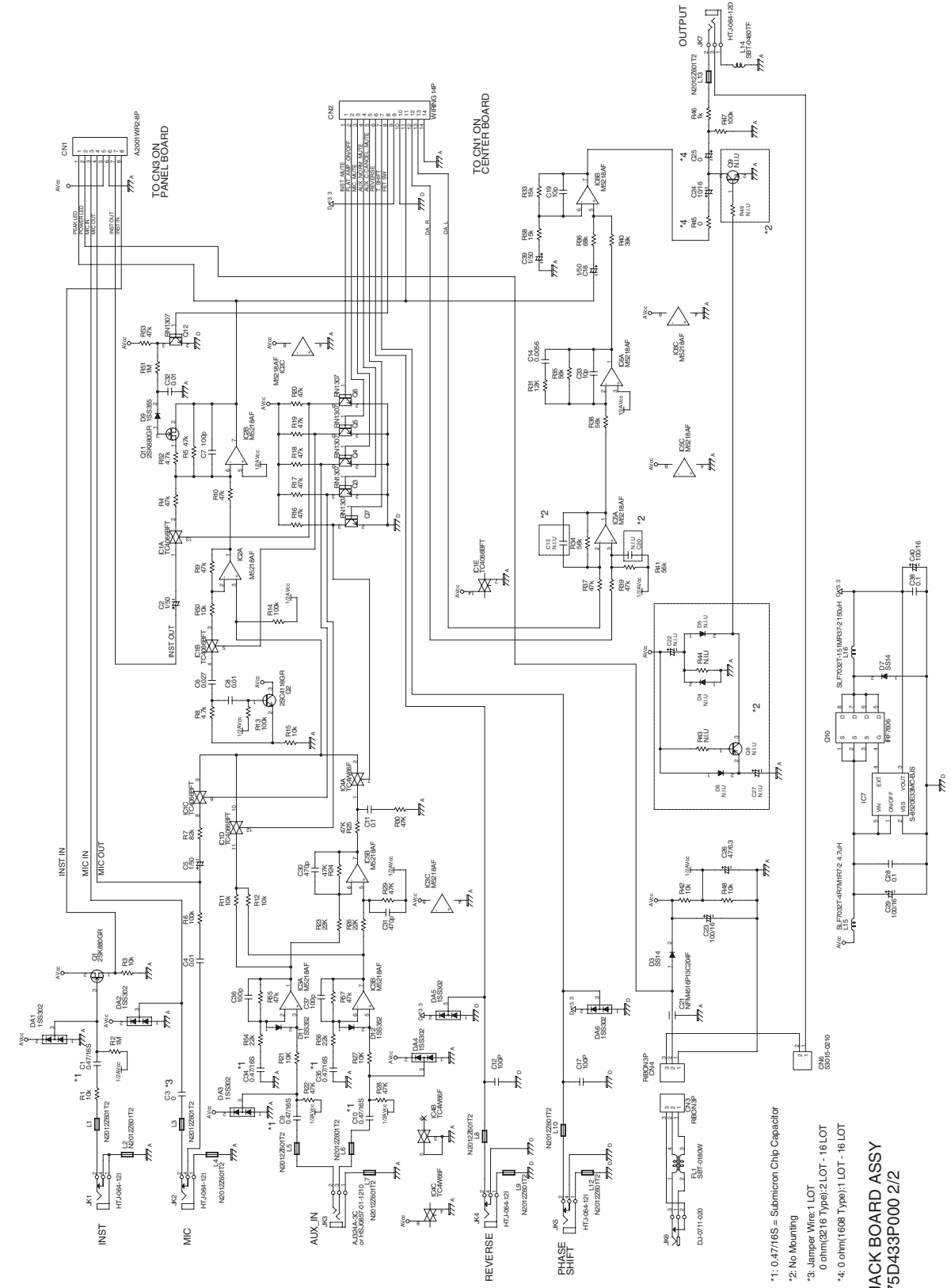


*1: 0.47/16S = Submicron Chip Capacitor

PANEL BOARD ASSY
75D433P000 1/2 *1LOT-16LOT
75D433P001 1/2 *17LOT-

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (JACK 1-16 LOT)

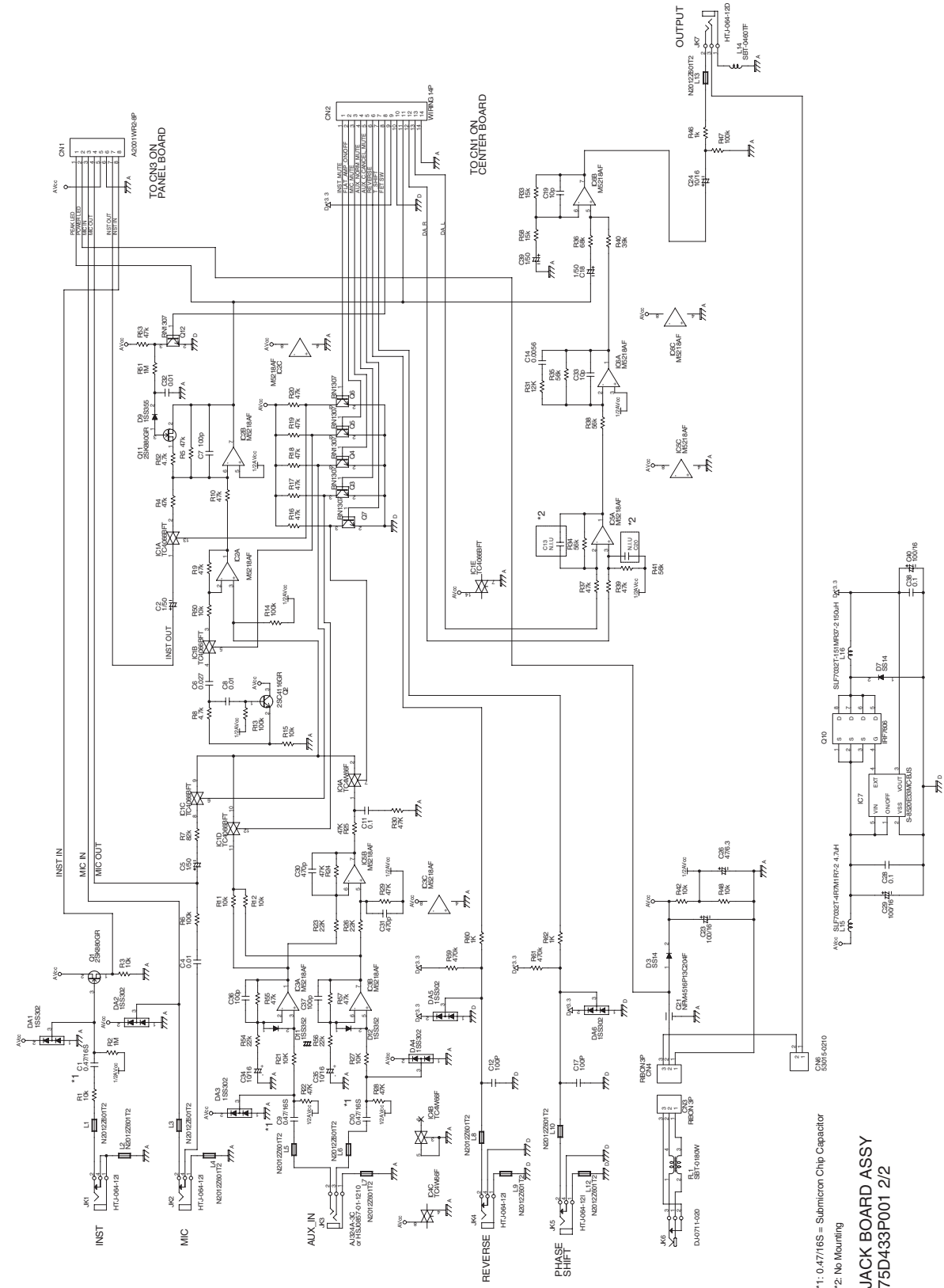


- *1: 0.47/16S = Submission Chip Capacitor
- *2: No Mounting
- *3: Jumper Wire: 1 LOT
- *4: 0 ohm (3216 Type): 2 LOT - 16 LOT
- *5: 0 ohm (1608 Type): 1 LOT - 16 LOT

JACK BOARD ASSY
75D433P000 2/2

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (JACK 17 LOT UP)



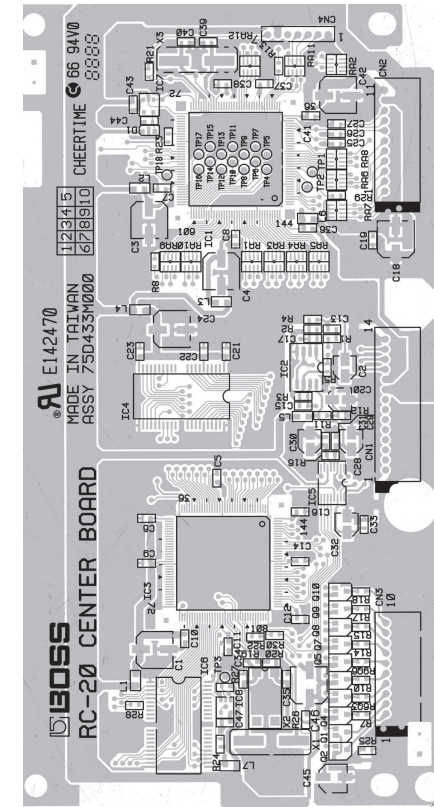
*1: 0.47/16S = Submicron Chip Capacitor
 *2: No Mounting

JACK BOARD ASSY
75D433P001 2/2

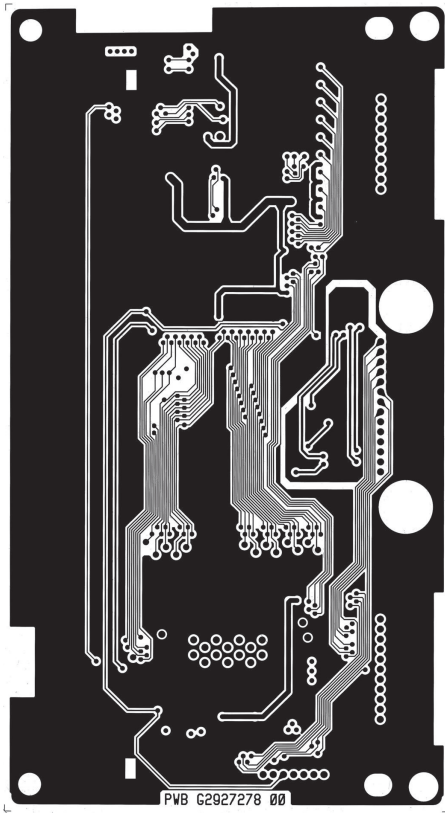
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (CENTER)

B C D E F G H I J K L M N O P Q R S T U V



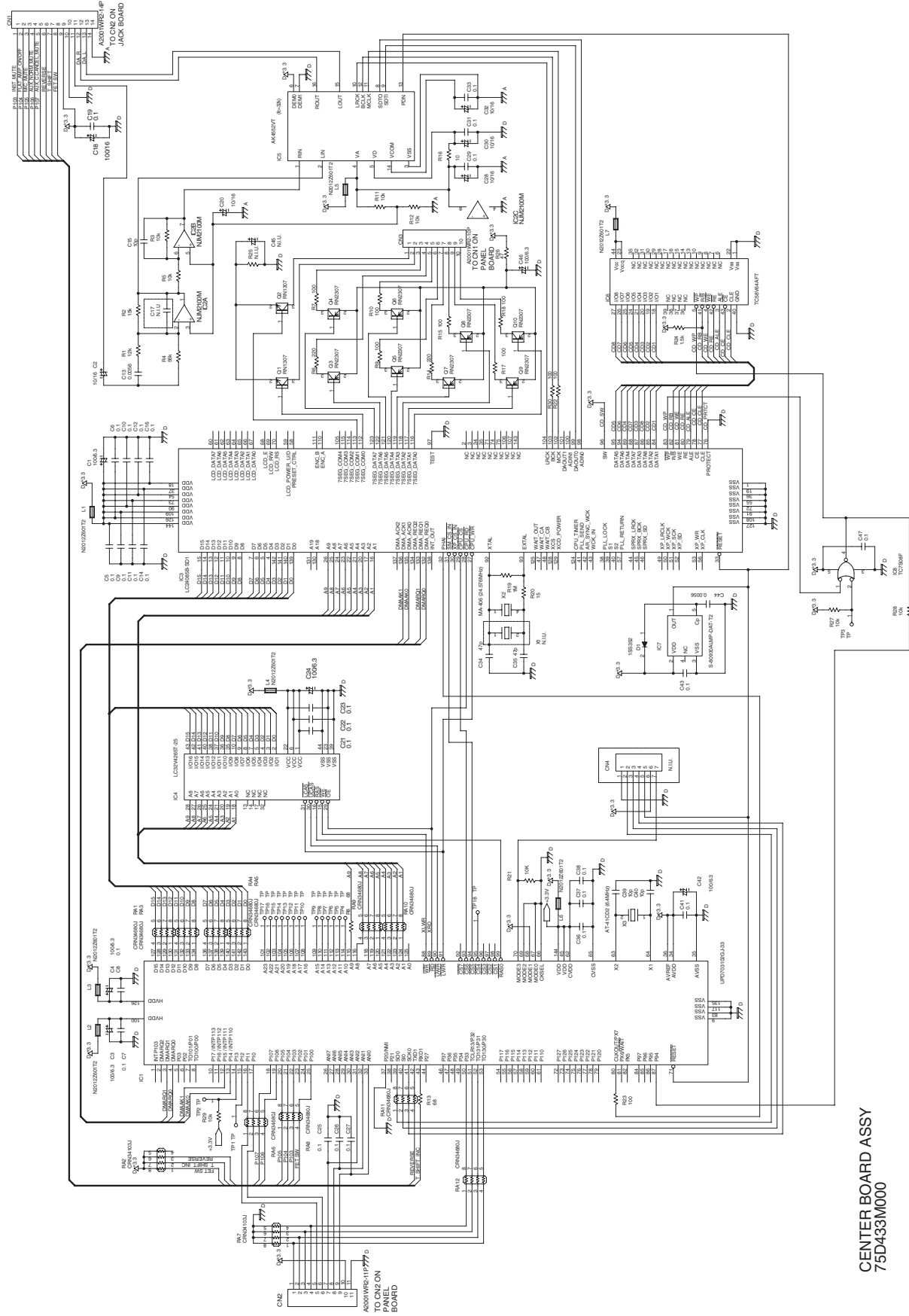
View from component side



View from foil side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (CENTER)



CENTER BOARD ASSY
75D433M000