CBO-232: RS-232 CARD for JRC NRD-525.

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`https://nrd525.qrvradio.fr/NRD525En.htm`
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DESCRIPTION, INFORMATION AND PRECAUTIONS

WARNING : *if the serial number of your JRC happens to be any of BR36071 through BR36120, the CPU EPROM must be replaced.*

(With the first EPROM version 7DEJD0072 and the 1200 Bauds speed, you can have some communication errors).

With this card, you can remote your NRD-525 with a RS-232 terminal or a computer. You can access to the frequency, read/write memory, mode, IF filter, attenuator and AGC.

Check the package content :

- ☐ This notice (9 pages).
- ☐ A quick reference guide.
- ☐ A ½ page questionnaire.
- ☐ The CBO-232 card (tested OK before sending).
- ☐ An internal P47 - J4n DB9 shielded cable (tested OK before sending).
- ☐ A RS-232 shielded cable, 3 wires (tested OK before sending).
- ☐ A 15mm plastic spacer.

If you encounter technical problems, contact a qualified technician or a professional assistance.
Some interventions are delicate.
The author does not assume any responsibility about the following procedure, neither for any consequent damage or problem. You make this modification on your risk and responsibility.

Before starting work, be sure to remove the power cable and all cables.

Do not remove any part witch does not need to be removed.

Use adapted tools.

⚠ **Warning !** This symbol indicates a particular precaution, or component sensitive to electrostatic discharge.
=> Before handling any components, be sure to wear an anti-static wrist strap or touch a grounded object.

=> WARNING : the contents in the preset memory may be lost after these operations.

CBO-232 card specifications:

- ☐ Based on a 8251 circuit and a programmable divider.
- ☐ RS-232 outputs with a classical circuit MAX232.
- ☐ Quartz reference: 3,6864 MHz.
- ☐ This card is installed in the CMH-632 connectors.
- ☐ The J47 connector is compatible with the JRC cable referenced H-6ZCJD00141.
- ☐ 9-pole male Sub-D RS-232 standard connector (DB9).
- ☐ RS-232 configuration: 8 data bits, 1 stop bit, no parity.
- ☐ 300 and 1200 Bauds (optional 2400 and 4800 Bauds).
- ☐ An onboard LED (SLW) indicates the slow speed.
- ☐ If you have the RTTY CMH-530 card:
  - Characters converted can output to the RS-232,
  - An auxiliary output can be used by an external device to decode others modes (RTTY ASCII, CW...).

TABLE OF CONTENTS

1- REMOVING COVER

☐ Disconnect all cables.
☐ Remove the upper cover slowly by loosening 4 screws, taking care not to break the speaker wires.
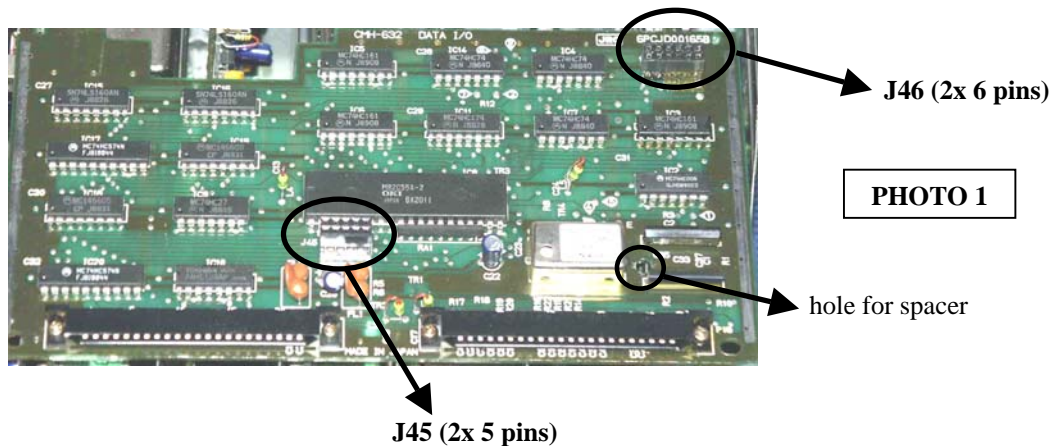☐ Remove the speaker connector (on the IF-AF AMP CAE-182 card).

2- CMH-632 DATA I/O card
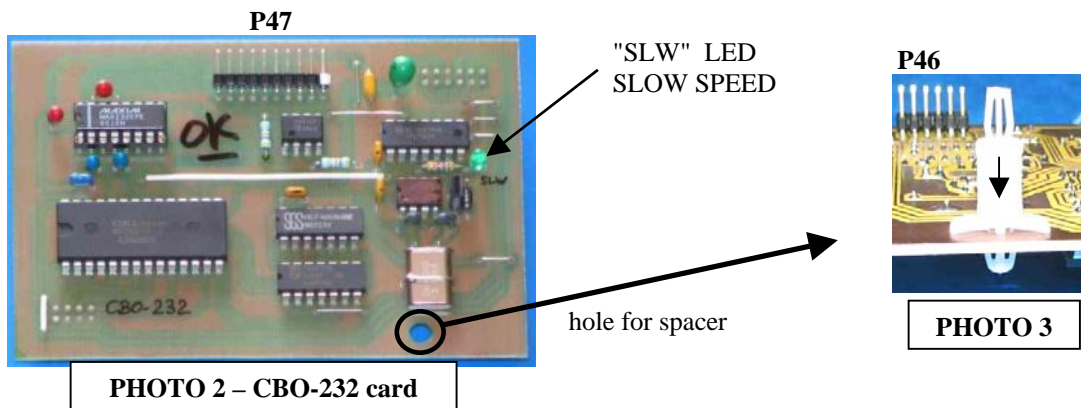
2.1- Removing

☐ Locate the DATA I/O CMH-632 card and remove it (insert the removal lever or a small screwdriver into the holes at both corners of the card).

2.2- Locating the connectors

Locate the J45 and J46 connectors on the **CMH-632** card:

J46 (2x 6 pins)

PHOTO 1

hole for spacer

J45 (2x 5 pins)

2.3- The CBO-232 card

P47

"SLW" LED
SLOW SPEED

P46

hole for spacer

PHOTO 3

PHOTO 2 – CBO-232 card

☐ Insert the plastic spacer in the hole of the CBO-232 card as indicated on the PHOTO 3.

☐ ⚠ Carefully insert the CBO-232 card in the J45 and J46 connectors, on the CMH-632 card. Make sure the spacer is fixed in the 2 cards. (See PHOTOS 3, 4 and 5).

⚠ **Incorrect installation can damage your receiver !!**
    Check all pins in all connectors.

CBO-232 card

CMH-632 card

PHOTO 4

PHOTO 5

P47
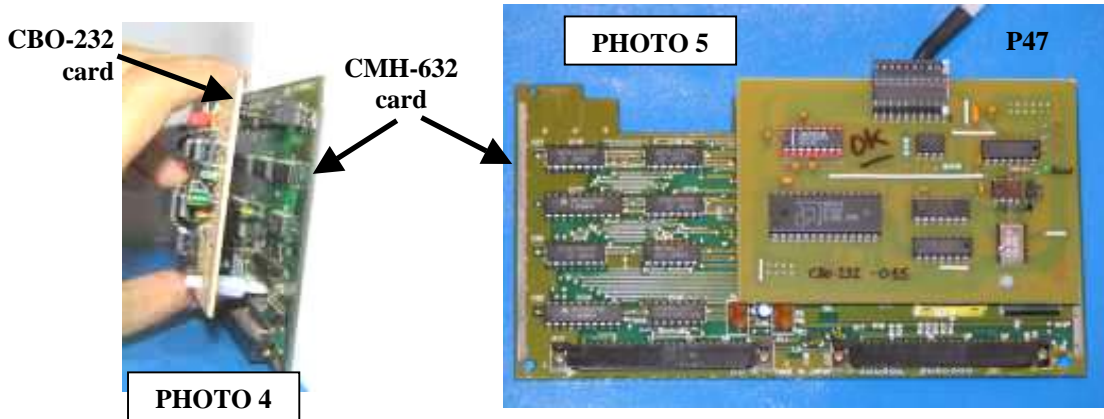
3- CONNECTORS

☐ Remove the RS-232 plastic cover, on the rear panel of the receiver
(SEE PHOTO 6).

PHOTO 6

You have 2 options:
1- Go the J4n SUB-D connector through the RS-232 hole and maintain it with a plastic clip. This simple solution is not advisable.
2- Make a cut to screw the connector on the rear panel, as indicated below (see PHOTO 7).

3.1- Cutting the rear panel

☐ Turn over your receiver. (The inferior face and the 4 feet are in direction of the sky).

☐ With a punch or a file, make this cut :

FIGURE 1

19mm

11mm

25mm

PHOTO 7

⚠ **Clean the work carefully without turning over the receiver.
There must be no iron filings or other metal part in the receiver !!**

3.2- Optional RTTY output
If you have the optional RTTY card (CMH-530), you can equip your receiver with an auxiliary RTTY output. Then, you can use this demodulated signal with an external device (see chapter 8). In this case, prepare a 3,5mm chassis mono jack connector.

☐ Turn over the receiver. (The inferior face and the 4 foot are in direction of the sky).

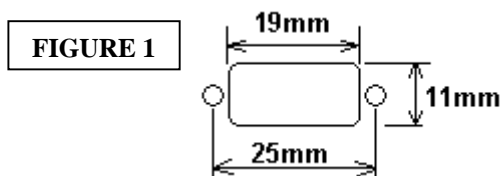☐ Drill <u>carefully</u> a 6mm diameter hole near the J4n RS-232 connector:

PHOTO 8

⚠ **Clean the work carefully without turning over your receiver.
There must be no iron filings or other metal part in the receiver !!**

☐ Solder the black wire <u>on the jack ground</u> and the blue wire on the center.

3.3- Connecting the P47 cable

☐ From the outer side of the receiver, put the P47 connector (10 pins) through the RS-232 hole.

☐ If you have cut the rear panel, screw on the 9-pole Sub-D connector (See PHOTO 8).

(☐ If you have chosen the chapter 3.2 option, screw on the 3,5mm jack).

☐ Connect the 10 pins P47 cable on the CBO-232 card, in the correct orientation, white mark is the pin 1.
　　(See FIGURE 3, page 6).

4- CPU CARD MODIFICATION FOR RTTY MODE
If you have the RTTY CMH-530 card and an old CPU EPROM (before the V2.0 version), you can, if you want, send all the decoding characters on the serial port. You will do this modification (opening the" ③ W3 " jumper). See chapter 8.

⇒ *After the V2.0 EPROM CPU version, this modification is not useful because this option is accessible with the NRD-525 keys.*

W3 jumper	
Close :	(Origin).
Open (cut) :	**The code converted RTTY are sending on the RS-232 output.**

4.1- Removing the CPU card

☐ Locate the CPU CDC-353 card and remove it (insert the removal lever or a small screwdriver into the holes at both corners of the card).

4.2- Cut the W3 jumper wire
Locate the 4 jumpers on the CPU card. Cut the " ③ W3 " jumper as below:
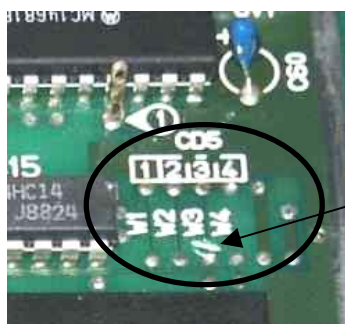
PHOTO 9

Cut the W3 jumper with a small cutter.

5- RE-ASSEMBLING THE RECEIVER

☐ Put the DATA I/O CMH-632 card back to the original position by securely inserting it along the rails. **Do not apply force on the CBO-232 card.**

☐ Make sure all the cards are seated properly in theirs slots.
☐ **Make sure there are no metal or other parts in your receiver.**

☐ Before closing the upper cover, connect the power cable and turn ON the power.

⚠ **The receiver should instantly work, if not, SHUTDOWN THE RECEIVER AND DISCONNECT THE POWER CABLE.**

Check all procedures. Make sure the cards are seated properly in theirs slots.

5.1- First test

☐ Press the 8 key with the MEMO key depressed and select "**300**" on the NRD-525 display.
  ⇨ On the CBO-232 card, the "SLW" LED lit on.

☐ Press the 8 key with the MEMO key depressed and select "**1200**" on the NRD-525 display.
  ⇨ The "SLW" LED turns off.

☐ Turn off the receiver and disconnect all cables.

(=> The SLW LED indicated the slow speed selection).
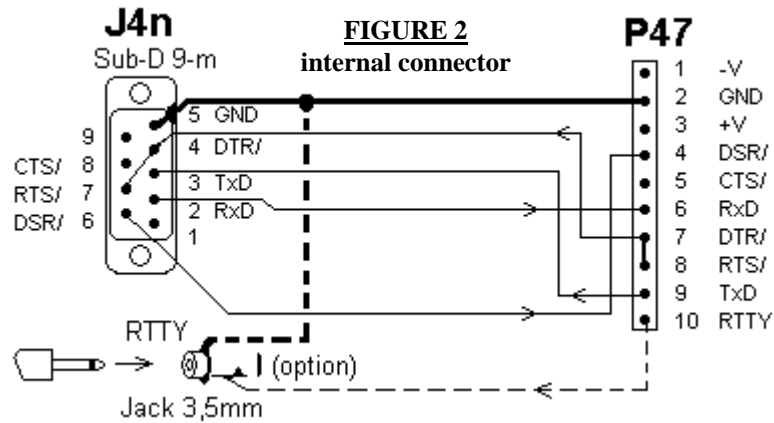
5.2- RE-ASSEMBLING

☐ Reconnect the speaker connector on the IF-AF AMP CAE-182 card.
☐ Mount the upper cover and the 4 screws.

6- CONNECTION CABLES

6.1- P47 internal cable <=> 9-pole male SUB-D connector

FIGURE 2
internal connector

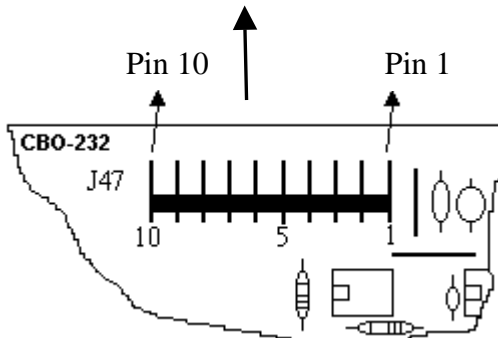| J47 P47 pins	direction	J4n pins	Function	
1	---->	nc		-12V to -5V
2	-----	5	GND	ground 0V (+ *RTTY option black wire*)
3	---->	nc		+5V to +12V
4	<----	6	DSR/	Data Set Ready
5 not connected	<----	nc (8)	CTS/	Clear To Send
6	<----	2	RxD	Reception Data
7	---->	4	DTR/	Data Terminal Ready
8	---->	7	RTS/	Request To Send
9	---->	3	TxD	Transmission Data
10	---->	*option*	*RTTY*	***RTTY card demodulator output (blue wire)***
J47 P47 pins	**direction**	**J4n pins**		

Pin 10   Pin 1

FIGURE 3
J47 connector
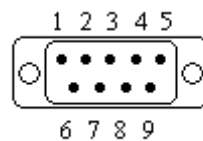
FIGURE 4
J4n DB 9 male connector
(JRC rear panel view)

Use a shielded cable, to limit noise.

9-pole female Sub-D NRD-525 connector	connections	9-pole female Sub-D computer connector
(GND) 5	●————————●	5 (GND)
(TxD) 3	● ⤫ ●	3 (TxD)
(RxD) 2	●◄ ►●	2 (RxD)
(CTS/) 8	●◄ ►●	8 (CTS/)
(RTS/) 7	● ●	7 (RTS/)
(DSR/) 6	●◄ ►●	6 (DSR/)
(DTR/) 4	● ●	4 (DTR/)
1	●◄ ►●	1 (DCD/)

6.3- 5 wires cable

Use a shielded cable, to limit noise.

9-pole female Sub-D NRD-525 connector	connections	9-pole female Sub-D computer connector
(GND) 5	●————————●	5 (GND)
(TxD) 3	● ●	3 (TxD)
(RxD) 2	●◄ ⤫ ►●	2 (RxD)
(DTR/) 4	● ●	4 (DTR/)
(DSR/) 6	●◄ ⤫ ►●	6 (DSR/)
(CTS/) 8	●◄ ►●	8 (CTS/)
(RTS/) 7	● ●	7 (RTS/)
1	●◄ ►●	1 (DCD/)

7- USE

☐ **<u>WARNING:</u> before connecting cables, be sure that all devices and the NRD-525 are connected to the earth (grounded power outlet).**

☐ Connect the RS-232 cable on the NRD-525 and an external device or computer and use a terminal program or other, with this configuration:

- 300 or 1200 speed,
- 8 data bits,
- 1 STOP bit,
- no parity.

☐ **All the commands are in upper-case letters.**

☐ **To access on the NRD-525 RS-232, you must be send a `H1` command to the receiver (See chapter 7.9) with your device or computer.** All the key switches, PBS, BFO and tuning are locked. Then you can access to the receiver with your RS-232 device. All the commands are described in the chapters 7.2 to 7.11.

7.1- SELECTION OF BAUD RATE ON THE NRD-525

☐ By pressing the 8 key with the MEMO key, you can select the 300 and 1200 Bauds rate, by turns.

☐ The NRD-525 display indicates: "`300`" or "`1200`" for 300 and 1200 Bauds.

☐ To clear this indication, press the CLR key.

⇒ *After the V2.0 EPROM CPU version, you can access and use the 2400 and 4800 Bauds rate.*

7.2- A function, attenuator

Select on/off 20dB attenuator.

A0	off
A1	on (ATT lit on).

7.3- B function, bandwidth filter

Select IF bandwidth filter.

B0	WIDE filter
B1	INTER filter
B2	NARR filter
B3	AUX filter
B4	direct 12KHz (no filter) $\Rightarrow$ ***This function is valid only after the V1.4 CPU EPROM version.***

7.4- C function, channel

Select and display a memory.
The receiver sends its status (see chapter 7.12).

Cxxx   xxx on 3 digits from **000** to **199**

7.5- D function, mode

Select receiving mode.

D0	RTTY (see chapters 4 and 8)
D1	CW
D2	USB
D3	LSB
D4	AM
D5	FM
D6	FAX

7.6- E function, recording

Write in the current memory channel. The receiver sends an audio beep.

E1

7.7- F function, frequency

Select a frequency on 8 digits.

Fxxxxxxxx

Example :	**F02800345**	for 28,00345 MHz
	F14413025	for 144,13025 MHz (with the VHF/UHF option).

7.8- G function, AGC

Select AGC.

G0	AGC SLOW
G1	AGC FAST
G2	OFF

7.9- H function, remote

Set on/off of external control. All the key switches are locked. The receiver sends its status (see chapter 7.12). Then you can access to the receiver with your RS-232 device.

H0	normal
H1	remote mode - *"REMOTE"* and LOCK lit on.

7.10- I function, information

The receiver sends information to the RS-232 port. It sends the status (see chapter 7.12).
On the receiver, when the channel, frequency, mode, AGC... is changed, the data changes are sent on the RS-232 port. This function is sent alone, without the `H1` function.

`I0`	normal mode
`I1`	information mode - *"REMOTE"* is lit.

7.11- J function, displayed personal parameters

$\Rightarrow$ *This function is valid only on the V1.4 and V1.5 CPU EPROM version.*

`J1` displayed your personal parameters on the RS-232:

```
CBO V1.5 xxxxxx EPROM Version
NRD-525 serial number name
```

7.12- STATUS

- After some functions, the receiver sends its status like this:

`C014`	memory N°14
`D2`	USB mode
`B2`	NARR IF filter
`G1`	AGC FAST
`A0`	attenuator off
`F01410815`	14,10815MHz frequency

- Each time you send a function from the external device, the receiver sends back the same instruction to confirm it.
  Example: if you send `A1`, the receiver sends back `A1` on the RS-232 port.

ONLY IF YOU HAVE THE CMH-530 RTTY DEMODULATOR OPTION :

8- RTTY CMH-530 CARD

- If the CPU W3 jumper is cut (see chapter 4), all the RTTY CMH-530 decoding codes are sent on the serial port (and at the same time on the J44 - "PRINTER" port). In this case, if the `H1` or `I1` function is sent from the external device, all the data are mixed (RTTY signal and status, frequency...).

- If the CPU W3 jumper is closed, the RTTY CMH-530 decoding codes are sending only on the J44 PRINTER port.

  The auxiliary output (see chapter 3.2) deliver the demodulated RTTY output with a +/-5 to +/-12 Volts signal level. This signal will be decoded with an external device or a computer.

  Then, you can decode others modes (BAUDOT RTTY, ASCII RTTY, AMTOR, SITOR, CW…).

  You can select the SHIFT width, with the MEMO 6 function and the BFO. (Referring to the CMH-530 card notice).

  Example for the CW : pick up the CW tone by the MARK or the SPACE filter in the RTTY demodulator.

`https://nrd525.qrvradio.fr/NRD525En.htm`

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