



Every effort has been made to make this manual correct and up to date. Due to continuous development of the product and by error or omission anomalies may be found and these are acknowledged. This manual is protected by copyright AOR LTD 1998. No information contained in this manual may be copied or transferred by any means without the prior written consent of AOR LTD. AOR and the **AOR** logo are trade marks of AOR, LTD. All other trade marks and names acknowledged. E&OE.
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(1) General

The AR8200 is designed to be connected to a computer using the optional CC8200 lead with built-in level shift conversion, this will enable computer control via the RS232 serial port of a computer. An additional piece of software will usually be required in order to address the computer's serial port with the correct set of parameters. If using an IBM-PC or clone (with 80386 processor or higher) **Microsoft Hyper Terminal** (or WINDOWS TERMINAL on Windows 3.1x) may be used to address the computer's serial port.

In order to gain the greatest flexibility, a specialist software package is desirable. For this reason a Windows based PC package is supplied FREE on the CD-ROM accompanying the CC8200 (this may also be made available from the AOR web site **WWW.AORJA.COM**).

For those wishing to compile their own software (for computers other than the PC etc) or for basic terminal control, please refer to the following command protocol.

(2) Supplied Accessories

Please check that the following items are included in the package:

- CC8200 lead with built-in level shift (9-pin D type connector) One
- CD-ROM containing protocol listing and PC software One

(3) Connection for RS232 operation

The option socket is mounted on the right hand side of the cabinet underneath the 12V d.c. input socket. The socket is protected from dust by a grey rubberised case stopper which is hinged toward the front of the cabinet. Gently lift the stopper from the rear edge to reveal the D-shaped metallic socket. Be careful to keep dust and dirt from this socket and to prevent liquid entering the AR8200 via this socket. Ensure that no conductive material is allowed to short circuit the socket which may damage the receiver.

Notes: *Switching the receiver On, setting of volume and adjustment of squelch cannot be achieved via the RS232 port. Computers "always" generate RF noise which may interfere with the AR8200 reception if the standard helical rubber aerial is used. To reduce the effects of noise, use of a remote aerial is highly recommended with good quality 50 OHM coaxial cable employed.*

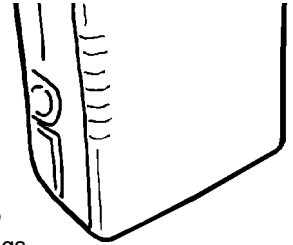
The following signals are available via the option socket including detector output, mute and AGC. This pin-out assumes connection using the AOR optional **OS8200** or **CC8200** leads (refer to page 117 of the English language operating manual):-

RED	+4.2V
BLACK	RXD
BLUE	GROUND
BROWN	MUTE
ORANGE	AGC
SHIELD	GROUND
WHITE	TXD
YELLOW	GROUND
GREEN	AUDIO OUT
GREY	DETECTOR OUT
PURPLE	GROUND

Note: *TXD + RXD (levels to drive a level shift converter)
 The voltage output level to drive external RS232 is deliberately below 'H' level. If connecting to an external I.C., you must be aware of latch status.*

Connect the optional CC8200 computer control lead to the option socket and connect to a computer.

The RS232 parameters may be defined using the CONFIG menu. Baud rates (transfer speed) may be set to 4800, 9600 or 19200bps. It is also possible to set an 'address' to facilitate connection of up to 99 AR8200 to a single port for custom operation, the addresses may be set between the limits of 01 to 99 with 00 representing single radio operation.



When operating from external RS232, the legend © will be displayed on the LCD. Please refer to **page 109 section 14-6** of the English language operating manual for information on the CONFIG menu settings.

If your computer has a 9-pin 'D' type connector then simply connect to the computer's serial port, if however the computer input is 25 way, either a 9-pin male - 25-way female adaptor (ensure all pins are connected through) or patch lead will be required. If a lead is used, the following connections are suggested:-

CC8200 9-pin male	PC 25 way female
2	3
3	2
5	7 GND
7	4
8	5

The following RS232 parameters are employed:-

Interface	Built in level shift within the CC8200 lead
Connections used	TXD, RXD, GND
Flow control	Software X flow
Baud rate	19200, 9600, 4800 (selectable)
Data	8 bit, 2 stop bits
Parity	None
RS232 command set	ASCII text, <CR> or <CR><LF> delimiter Note: The ↑↓↔ arrow keys and remote ID command (^A) are non-printable

Both the computer and AR8200 must use the same parameters for correct operation. If data is regularly lost or corrupted, try using a slower speed such as 4800 baud. Use of a slower baud rate should not greatly reduce overall communications transfer rate since the processing time within the receiver as PLL lock-time ultimately restricts the whole process.

Note: When changing BAUD rate, switch the AR8200 Off/On to ensure the new speed is selected.

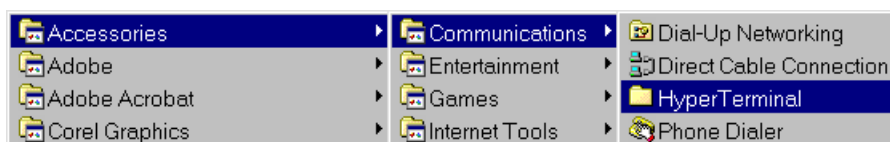
(4) Use of Microsoft WINDOWS 'Terminal' and 'HyperTerminal'

Windows 3.1x uses TERMINAL in a similar way using TERMINAL in the program Manager group. If the terminal program has not been configured an error message will appear (depending upon the serial port / mouse configuration). Click on [OK] to continue. TERMINAL will open and appear on the screen. You may re-size or maximise the screen at this point. Click on the **Settings** heading toward the top of the screen so that the communications and terminal parameters may be configured. Click on "TERMINAL EMULATION" then select "ANSI" then click on [OK]. Click on the **Settings** heading toward the top of the screen so that the communications and terminal parameters may be re-configured. Click on "TERMINAL PREFERENCES" then select the required options. Finally click on [OK]. Click on the **Settings** heading toward the top of the screen so that the communications and terminal parameters may be re-configured. Click on "COMMUNICATIONS" then select the options as required. The choice of COM port (COM1, COM2 etc) will depend upon your computer serial port and mouse configuration. Finally click on [OK]. Click on the **File** heading toward the top of the screen and select SAVE_AS. This will enable the chosen parameters to be saved in a file which may be OPENED next time TERMINAL is selected so that the parameters will not require future re-configuration (.TRM being the default extension). The file is saved in the main WINDOWS sub directory. For further information regarding WINDOWS TERMINAL and configuration, please refer to the operating manual supplied with Microsoft software and the computer. Click on "COMMUNICATIONS" then select the required options. The choice of COM port (COM1, COM2 etc) will depend upon your computer serial port and mouse configuration. Finally click on [OK].

Assuming you have **Windows98** loaded on an IBM-PC compatible computer (**Windows95** setup is virtually identical) click on the START button:



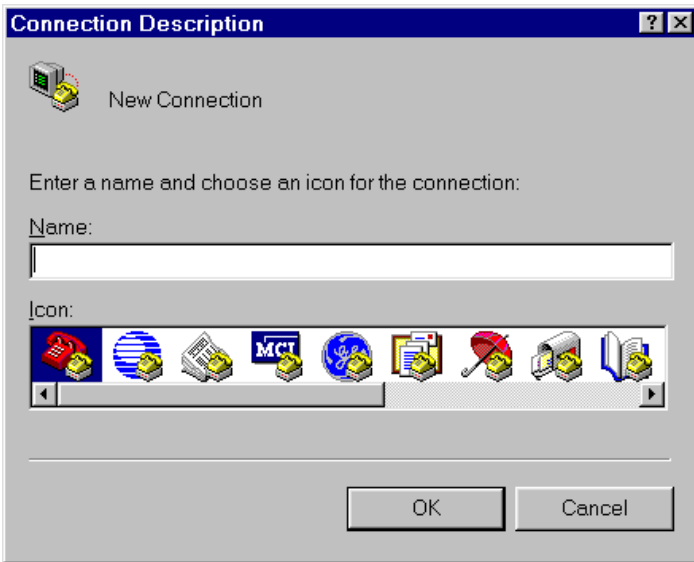
Next scroll up through PROGRAMS, ACCESSORIES, COMMUNICATIONS and onto HYPER TERMINAL (click):



The following screen will be displayed:



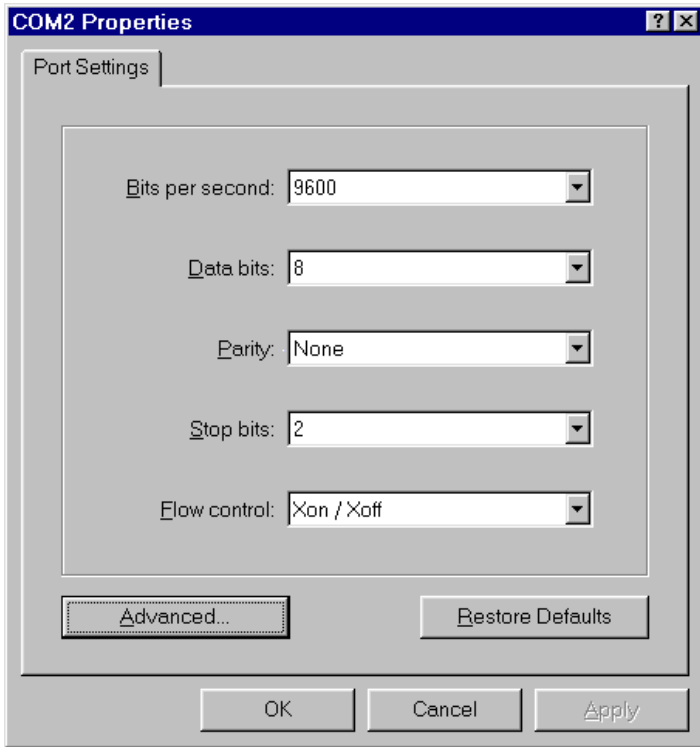
Double **click** the **HYPERTRM.EXE** icon, the following screen will be displayed (this may take quite a few seconds as Windows checks your hardware):



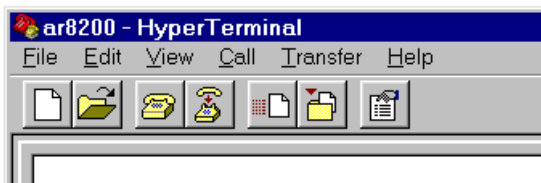
Enter an identifying name, such as **AR8200** then click on **OK**. The **CONNECT TO** screen will be displayed:



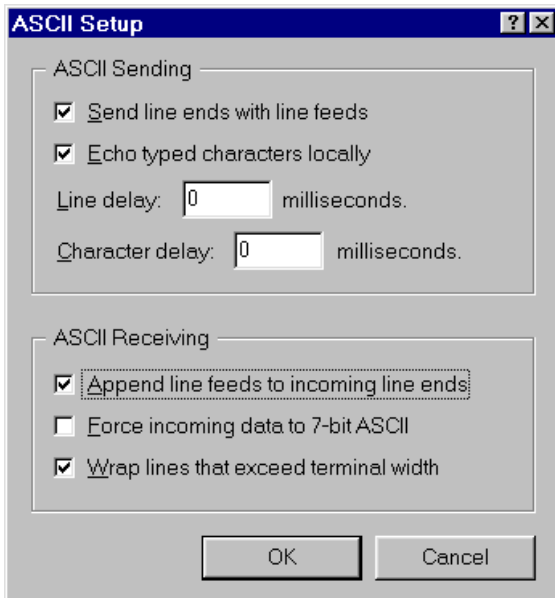
Select the required communications port (serial port). By default, Com1 is selected, this is correct for most lap-top computers but **Com2** is more usual for a desktop computer (especially when a serial mouse is used on Com1). Click on **OK**.



Input the required communication parameters as shown above (this example shown 9600 baud but you can select 4800 or 19200), whichever has been configured on in the AR8200 receiver... they **MUST** be the same. Click on **OK**.



Select the 'PROPERTIES' icon (finger pointing at a written page), select 'SETTINGS' then **click** on '**ACSII Setup**'.



Click on the fields indicated to add carriage returns to outgoing and incoming text. Echo displays your keyboard strokes input on to the computer screen. If incoming text is double-spaced, remove the tick box for 'ASCII Receiving'. Click **OK**.

Refer to the command listings later in this section... to try out the link, ensure that the AR8200 is in 2VFO mode (if not type **VA [ENTER]**) then type the command **RX [ENTER]** via the computer keyboard. The AR8200 should respond with the current frequency displayed on the AR8200. To change frequency type **RF123 [ENTER]**, the AR8200 should change to 123.000 MHz.


(5) How to send a command

Each command comprises of two upper case letters (header) along with options as required. All commands use ASCII code which **MUST BE IN UPPER CASE** (except for the ↑↓↔⇒ arrow keys and remote ID command (^A) which are non-printable and use the control codes of ASCII).

A multiple command entry is only valid where specified. Where a multiple command entry is allowed, each command MUST be separated with a space "h20" (HEX DECIMAL). Each command is completed with a [CR] or [CR] [LF]. Although there is no local echo, either [CR] or specified response should come back from the receiver after confirming the correct command.

If no response has been gained after a short while, the receiver has failed to receive the command properly. Send a [CR] then re-send the command. Should problems persist, check your connections and try reducing the RS232 baud rate.

AR8200 remote indication

When the AR8200 has received a command via the RS232C port the receiver's LCD will display the ☉ symbol. The AR8200 will appear frozen while RS232 operation is in progress. To return operation to the radio keyboard, PUSH  (ENT) on the AR8200.

(6) Command index

^A	Remote ID	PP	Priority channel
AF	Automatic Frequency Control	PQ	Wait time for LC2
AM	Bandscope analyser	PR	List pass frequencies
AP	Auto power off	PW	Write search pass frequency
AS	Search auto store	QM	Quick memory
AT	Attenuator	QP	Power off
AU	Auto mode	QS	Delete search bank
BM	Scan bank linking	RF	Set receive frequency
BP	Search bank protect	RX	Respond with current data
BS	Search bank linking	SA	Search audio squelch
CF	Bandscope centre frequency	SB	Search level squelch
CN	CTCSS operation	SC	Voice inverter frequency (requires the optional V18200 slot card)
DA	Dial (VFO) audio squelch	SD	Search hold / delay time
DB	Dial (VFO) level squelch	SE	Set search data
DC	Bandscope date centre frequency	SH	Set offset step
DD	Dial (VFO) delay	SI	Voice inverter on/off (requires the optional V18200 slot card)
DP	Dial (VFO) pause	SL	Lower search frequency limit
DS	Bandscope ****	SM	Start select scan
DT	Display frequency (on/off)	SP	Search pause time
EX	Exit RS232	SR	Recall search parameters
GA	Select scan	SS	Start search
GD	Release select scan channels	ST	Tuning step size
GM	Scan parameter selection	SU	Upper search frequency limit
GR	Select scan recall	SW	Bandscope span width
GS	Search parameter selection	TB	Set text description for bank
GV	VFO status list	TI	Set priority interval
LB	LCD contrast	TM	Memory text
LC	Frequency & level status	TS	Text search
LM	Signal meter reading	TT	Search bank text
LS	Tone eliminator frequency (requires optional TE8200 slot card)	VA	Set VFO A
MA	List a block of memory channels	VB	Set VFO B
MC	Monitor control (forced squelch)	VF	Select 1-VFO mode
MD	Receive mode	VL	Beep volume
MF	Bandscope set marker frequency	VR	Firmware version
MP	Set memory channel pass	VS	VFO search
MQ	Delete memory channel or bank	VT	VFO auto-store
MR	Memory recall	VV	VFO scan
MS	Scan mode	WM	Write protect bank
MW	Memory bank resizing	WP	Write protect enable
MX	Memory write	XA	Scan audio squelch
NL	Noise limiter	XB	Scan level squelch
OF	Frequency offset	XD	Memory scan delay time
OL	Set and list frequency offset	XM	Mode scan
OM	Opening message	XP	Scan pause setting
PA	Power save	UP/DOWN	Tuning arrows
PC	Protect memory channel		
PD	Delete pass frequency		
PH	Bandscope peak hold		
PI	Power save interval		

(7) Detailed command listing for the AR8200

^A	Remote ID	Hex value 0x01 Accepts a value <i>nn</i> in the range 01-99
AF	AFC	To set: AF <i>n</i> <CR> <i>n</i> =0 (off), <i>n</i> =1 (on) To read: AF<CR> Response is AF <i>n</i> Note: Not valid in WFM, USB, LSB or CW
AM	Bandscope Analyser Mode	AM<CR> starts bandscope mode AM<CR> repeated when in bandscope mode generates a report in the following format: AM PH0 CF0091000000 MF0091000000 SW1
AP	Auto Power off	AP <i>nn</i> <CR> <i>nn</i> =00 (off) <i>nn</i> =05-95 (sets 0.5 - 9.5 hours to power off following last active transmission) To read: AP<CR> Responds with AP <i>n.n</i> (where <i>n.n</i> is the delay time in hours or 0.0 = off) Note: <i>nn</i> must be in multiples of 0.5 hours
AS	Search auto-store on/off	To set: AS <i>n</i> <CR> <i>n</i> =0 (off), <i>n</i> =1 (on - write frequency into bank J), <i>n</i> =2 (on - same as 1 but erase previous channels to create space for new entries), To read: AS<CR> Response is either <i>n</i> =0 (off) or <i>n</i> =1 (on) Note: Stores into the search group nominated by GS
AT	Attenuator	To set: AT <i>n</i> <CR> <i>n</i> =0 (off), <i>n</i> =1 (on) To read: AT<CR> Response is AT <i>n</i> , where <i>n</i> =0 (off) or 1 (on)
AU	Auto mode	To set: AU <i>n</i> <CR> <i>n</i> =0 (off), <i>n</i> =1 (on) To read: AU<CR> Response is AU <i>n</i> MD <i>m</i>
BM	Scan bank link setting	To read: BM<CR> Responds with: BM <i>nnnnnnnnnnnnnnnnnnnn</i> , where <i>n</i> = character corresponding to linked bank (A - J or a - j), or - (not linked) Example: BM-BCD----- indicates that banks B, C & D are linked To set: BM <i>nnnnnnnnnnnnnnnnnnnn</i> <CR> Where <i>n</i> is a character which specifies a bank which will have its link status toggled (A - J or a - j). There is no need to enter a "-" to avoid changing a bank link BM%%<CR> clears all link settings BM%% <i>nnnnnnnnnnnnnnnnnnnn</i> <CR> clears all links except those specified Examples: BM abc toggles the link status for banks a, b & c BM%% bc clears the link status for all banks except b & c Note: As defined by GM.
BP	Search Bank Protect	To set: BP <i>n</i> <i>n</i> =0 (off), <i>n</i> =1 (on) To read: BP<CR> Response is BN <i>n</i>
BS	Bank link search	To read: BS<CR> Responds with: BS <i>nnn...n</i> , where <i>n</i> = character corresponding to linked bank, or - (not linked). The search bank indicators range from A - T and a - t (40 search banks in all) Example: BS-BC---F-HIJ-----R--a---e--h-j----no---st Indicates that the banks shown are linked.

To set: BS *nnn...n*<CR>
 Where *n* is a bank indicator in the range A-T or a-t
 BS%%<CR> clears all link settings
 BS%%*nnn...n*<CR> clears all link settings except those listed

Examples:

BSABRabcmp<CR> toggles the link state for the banks shown
 BS%% BFT<CR> clears all links except for the banks B, F & T

Note: As defined by GS.

CF Bandscope centre frequency

To read: CF<CR>
 Responds with CF*nnnnnnnnnn*
 To set: CF*nnnnnnnnnn*<CR> or CF*nn.nnn*
 Set the bandscope centre frequency to the specified frequency (expressed in Hz or MHz depending on format)
Note: Maximum resolution is 10kHz for spans 10MHz - 500kHz; maximum resolution is 2kHz for spans 200kHz-100kHz. Frequencies below 2kHz are not accepted.

CN CTCSS operation

Requires CT8200 option
 To read: CN<CR>
 Responds with CN*nn nn=0* (off), *nn=01* (auto), *nn=06-37* (a frequency from the following table)

<i>nn</i>	freq	<i>nn</i>	freq	<i>nn</i>	freq	<i>nn</i>	freq
00	off	10	136.5	20	241.8	30	177.3
01	auto	11	141.3	21	250.3	31	183.5
		12	146.2	22	67.0	32	189.9
		13	151.4	23	71.9	33	196.6
		14	156.7	24	74.4	34	199.5
		15	162.2	25	77.0	35	206.5
06	94.8	16	167.9	26	79.7	36	229.1
07	100.0	17	173.8	27	82.5	37	254.1
08	103.5	18	179.9	28	85.4		
09	107.2	19	186.2	29	88.5		
0A	110.9	1A	192.8	2A	91.5		
0B	114.8	1B	203.5	2B	97.4		
0C	118.8	1C	210.7	2C	69.4		
0D	123.0	1D	218.1	2D	159.8		
0E	127.3	1E	225.7	2E	165.5		
0F	131.8	1F	233.6	2F	171.3		

To set: CN*nn*<CR>, where *nn* is a two digit value from the table

DA Dial (VFO) audio squelch

To set: DA*nnn*<CR>
nnn=000 - 255 (where 000=audio squelch off)
 To read: DA<CR>
 Responds with DA *nnn* or DA+*nnn* (+ = current audio squelch level >= *nnn*)

DB Dial (VFO) level squelch

To set: DB*nnn*<CR>
nnn=000 - 255 (where 000=level squelch off)
 To read: DB<CR>
 Responds with DB *nnn* or DB+*nnn* (+ = current level >= *nnn*)

DC Data centre Frequency

To read: DC<CR>
 Responds with DC *nnn*
Example: DC000
Note: Valid only when bandscope is on
Note: Refer to the LM command

DD Dial (VFO) delay

To set: DD*nn*<CR>
 Where *nn* = 00 - 99 or FF (indicating 0.0 - 99 seconds or FF=hold)
 To read: DD<CR>
 Responds with DD*n.n*

DP Dial (VFO) pause

To set: DP*nn*<CR>
 Where *nn* = 00 or 01 - 60 (indicating 1 - 60 seconds or off)
 To read: DP<CR>
 Responds with DD*nn*

DS Data analysis (bandscope)

DS<CR>

Responds with wave form data from the bandscope. This is valid only when the bandscope is functioning. Data is output on completion of each sweep over the span, data is not continuous so response will not be instantaneous. Each datum is assigned a number totalling 1024 with 16HEX. The minimum value of each datum is [2] and maximum [F] by 16HEX. [0] = not measuring, out of span (not 10MHz or 200kHz span). [1] = out of specification of receive frequency.

Note: When the span has been narrowed while measuring takes place, only the newly selected span range will be renewed with fresh data. Care must be taken when the marker frequency is replaced with the centre frequency.

Example of data analysis response:

DS<CR>

```
DS1023 : 2222222222222222 2222222222222222
DS0991 : 2223344433222222 2233322334432233
DS0959 : 2223AFB722223322 2222354222222233
DS0927 : 22222222248A9632 2222222498532222
DS0895 : 2232222456522222 2389A64223344322
DS0863 : 2222222233343222 2222442222333222
~ ~ ~ ~ ~ ~ ~ ~ ~
DS0095 : C862222552224652 2222235422222222
DS0063 : 2238B96322255222 2233322233223332
DS0031 : 23345F9654222222 3334334332222222
```

Note: Data is always sent 32 lines at a time.

Frequency is obtained from the data of the centre frequency. Even if the span is selected as 5MHz, 500kHz or 100kHz, the response is always based on 10MHz or 20kHz.

When the marker is moved, the data between the centre frequency and the new marker frequency will be renewed.

Frequency data is still obtainable from the centre frequency.

Note: When a centre frequency is entered, all figures (numbers) except the sweep range (upper and lower frequencies) will be void.

↓ centre frequency

```
DS1023 : 2222222222222483 224535AD83332142
```

↑ centre frequency

There are 1000 pieces of data over a 10MHz span in 10kHz steps, plus 24 pieces in reserve.

Note: Data is sent continuously, either buffer memory is required or high speed processing is required in order not to miss data.

```
DS0543 : 345354339AFD9633 59564323433379AD
DS0511 : 8634345443369642 2532423333458423
          ↓ -10MHz
DS0031 : 233459A654222222 3334334332222222
```

All figures are data number (marker frequency = centre frequency)

Span	10MHz	5MHz	2MHz	1MHz	50kHz
Upper frequency	1023	800	620	572	545
Centre frequency	512	512	512	512	512
Lower frequency	12	260	410	442	482

Each one represents 10kHz

Span	200kHz	100kHz
Upper frequency	118	92
Centre frequency	64	64
Lower frequency	00	29

Each one represents 2kHz

DT Display frequency text

To set: DTn

n=0 (off), n=1 (on)

Note: Frequency display is blank when n=1

To read: DT<CR>

Response is DTn

EX Exit RS-232

EX<CR>

Terminates remote operation via the RS-232 and restores normal operation from the radio's front panel.

GA	Select Scan on/off	To set: GA n <CR> $n=0$ (off), $n=1$ (on)
GD	Release select scan channel	To set: GD nn <CR> nn = channel (00-49) To clear all memory select scan settings, use GD%%<CR> To read: GD<CR> Response is GD nn Note: A select scan channel number will be incremented each time select scan channel has been released. Confirmation is via the GR command
GM	Scan parameter selection/status	To set: GM n <CR> Tags the current memory with label $n = 0$ (fixed presets only) - 9 (user definable) To read: GM<CR> Example: GM GM0 XD2.0 XB 000 XA 000 XP00 XMF BM ----- Note: Refer to individual commands for details of each field.
GR	Recall tagged channels for select scan	GR<CR> Lists selected channels from those available for select scan. Response is of the form: GR nn MX mnn RF $nnnnnnnnnn$ ST $nnnnnn$ AU n MD n AT n TM $xxxxxxxxxxxx$ Note: Refer to individual commands for details of each field.
GS	Search parameter selection/status	To set: GS n <CR> Where $n=0$ (fixed presets only) - 9 (user definable) To read: GS<CR> Example: GS GS0 SD2.0 SB 000 SA 000 SP00 AS0 BS ----- Note: Refer to individual commands for details of each field.
GV	VFO set list	To read: GV<CR> Reads current status of the VFO as a list of parameters Example: GV GV DD0.0 DB 000 DA 000 DP00 VT0 Note: Refer to individual commands for details of each field.
LB	LCD contrast	To set: LB nn <CR> $nn=00$ - 31 To read: LB<CR> Responds with LB nn
LC	Respond with frequency and level when squelch opens	To set: LC n <CR> $n=0$ (off), $n=1$ (on), $n=2$ (special mode) To read: LC<CR> Responds with LC n When active, data in the following format is returned when the squelch opens: LC nnn V x RF $nnn...n$ or LC nnn SR x RF $nnn...n$ or LC nnn M nxx RF $nnn...n$ When inactive, the radio returns LC data indicating the end of the transmission as follows: LC% nnn V x or LC% nnn V x or LC% nnn V x Notes: 1. Receive frequency and S-meter level are output when squelch opens (range of nnn reported by LC is 120-220 approx but varies from set to set) 2. Response is made automatically every time squelch opens or closes and is

affected by squelch parameters such as level and voice scan
3. Special mode (LC2) enables a continuous stream of frequency data to be output when squelch is open. This allows shift to next frequency after a pre-defined delay specified by PQ in search/scan. This also allows for high resolution spectrum analysis.
4. Signal level values may be specified 000-255, but only 100-255 is used. The AGC voltage is processed in 256 steps internally.
Note: Refer to individual commands for details of each field.

LM Respond with S-meter reading
 To read: LM<CR>
 Responds with a 256-level s-meter sample in hexadecimal, LMmnnn, where nnn = 128-256 and m is either “ ” (squelch open) or “%” (squelch closed)

LS Tone eliminate frequency
 Requires TE8200 option
 To set: LSnnn (000-255) (000=off)
 The following mapping is used between nnn and tone frequency:

Tone Freq	nnn	Tone Freq	nnn
0.4 (kHz)	0-60	2.6 (kHz)	230-235
0.6	70-110	3.0	237-240
1.0	160-170	3.4	240-245
1.4	190-200	3.8	245-248
1.8	210-220	4.2	248-250
2.2	220-230		

To read: LS<CR>
 Responds with LS nnn or LS+nnn (for mute on)

MA List a block of ten memory channels
 To read: MA<CR> or MAn<CR> (n= bank A-J or a-j)
Example:
 MA
 MXA00 MP0 RF0101100000 ST100000 AU0 MD0 AT0 TM
 MXA01 MP0 RF0460900000 ST010000 AU0 MD1 AT0 TMTTest 2
 MXA02 MP0 RF0085900000 ST100000 AU0 MD0 AT0 TMTTest 3
 MXA03 MP0 RF0085900000 ST020000 AU0 MD1 AT0 TMTTest 4
 MXA04 MP0 RF0085900000 ST020000 AU0 MD6 AT0 TMTTest 5
 MXA05 MP0 RF0085900000 ST020000 AU0 MD7 AT0 TMTTest 6
 MXA06 MP0 RF0085900000 ST010000 AU0 MD2 AT0 TMTTest 7
 MXA07 MP0 RF0085900000 ST001000 AU0 MD8 AT0 TMTTest 8
 MXA08 MP0 RF0085900000 ST000050 AU0 MD4 AT0 TMTTest 9
 MXA09 MP0 RF0085900000 ST000050 AU0 MD3 AT0 TMTTest 10
Note: Refer to individual commands for details of each field.

MC Monitor Control
 To set: MCn<CR>
 0 normal squelch operation
 1 squelch forced closed
 2 squelch forced open

MD Receive mode
 To set: MDn<CR>
 0 WFM
 1 NFM
 2 AM
 3 USB
 4 LSB
 5 CW
 6 SFM
 7 WAM
 8 NAM
 To read: MD<CR>
 Responds with mode value as above

MF Set Marker Frequency
 To read: MF<CR>
 Responds with MFnnnnnnnnnn
 To set: MFnnnnnnnnnn<CR> or MFnn.nnn
 Set the bandscope marker frequency to the specified frequency (expressed in Hz or MHz depending on format)
Note: Maximum resolution is 10kHz for spans 10MHz - 500kHz; maximum resolution is 2kHz for spans 200kHz-100kHz

MP	Set memory channel as pass	<p>To set: MPn<CR> $n = 0$ (pass off), $n = 1$ (pass on)</p> <p>To read: MP<CR> (when in memory read mode)</p> <p>Note: Setting pass on a memory channel excludes it from scans</p> <p>Note: "?" is returned when not in M.RD mode</p>
MQ	Delete bank or memory channel	<p>MQ<CR> Deletes the current memory channel (when in memory recall mode)</p> <p>MQnn<CR> Deletes memory channel nn</p> <p>MQ$x\%\%$<CR> Deletes all memory channels from bank x.</p> <p>Note: Responds with "?" when a memory channel is protected. Refer to PC, WM and WP commands</p>
MR	Recall memory channel	<p>MRxnn<CR> recalls memory channel nn from bank x (A-J or a-j)</p> <p>To read the current memory channel: MR<CR></p> <p>Note: Responds with "?" if the channel is blank</p>
MS	Scan mode	<p>MS<CR> Starts scan using the current memory bank</p> <p>MSx<CR> Starts scan using memory bank x (A-J or a-j)</p> <p>Note: to scan and report active frequencies, see LC command</p> <p>Note: Responds with "?" if the channel is blank</p>
MW	Memory Bank resizing	<p>MWxnn<CR> Sets number of channels in bank x to nn (where $nn=10-90$)</p> <p>MWx<CR> Responds with the current allocation for bank x: MW $x:nn y:mm$</p> <p>Example: MWA MW A:50 a:50 MW$\%\%$<CR> or MW<CR> Responds with a list of 10 allocations</p> <p>Example: MW$\%\%$ MW A:50 TBAAOR Test MW a:50 TBa MW B:50 TBBAOR Test MW b:50 TBbaer band MW C:50 TBCham call MW c:50 TBcair band MW D:50 TBDrepeater MW d:50 TBdaer band MW E:50 TBEMARINEch MW e:50 TBeair band</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. This feature allows the size of memory banks to be changed in size from 10 to 90 channels. Note, the total number of channels allocated to each bank pair (upper and lower case) remains 100 channels (ie size of A + size of a = 100). 2. It takes a significant amount of time to execute this command. Do not attempt to send another command until the radio responds with a <CR>. 3. When the size of a bank is changed, any channels that are allocated from the smaller bank to the larger are erased (ie setting bank B to 80 channels and b to 20 channels, then resetting B to 30 channels will cause the last 50 channels of B to be erased)
MX	Write data to memory	<p>MXxnn RF$nnnnnnnnnn$ AUn ST$nnnnnn$ MDn ATn TM$xxxxxxxxx$<CR></p> <p>Writes data of the format shown into memory channel nn in bank x</p> <p>Fields are separated by a space.</p> <p>TM permits a 12-character alphanumeric ASCII comment</p> <p>Automode will be selected if any fields are skipped but MX, RF & TM cannot be skipped. (MX cannot be sent on its own).</p> <p>Note: Refer to the individual commands for further details</p> <p>Note: Do not use while scanning or searching.</p>

NL	Noise Limiter	To set: NLn<CR> n = 0 (off), n = 1 (on) To read: NL<CR> Response is NLn
OF	Select offset frequency	OFnnx<CR> Selects offset frequency at index nn (00-47, 00=off) and defines offset to be x (+/-) OF<CR> Returns with the current offset frequency data as follows: OFmmx RF0nnnnnnn00 (where mm is the offset index value and x is + or -) Notes: 1. OF can be used on its own or with MX and SE 2. Allows access to a table of offset frequencies defined by OL 3. Automode operation is switched off when an offset frequency is entered 4. The offset frequency range is 0.1 -999.99 MHz 5. Index 00 specifies offset operation off 6. Indexes 20-47 are reserved for automode and cannot be altered
OL	Set and list offset frequencies	OL<CR> Lists ten offset frequencies from the table OLmm<CR> Lists ten offset frequencies starting from index mm (00-47) Format of listing is: OLmm RF0nnnnnnn00<CR> OLmm 0nnnnnnn00<CR> Specifies the stated offset frequency for offset mm Note: See notes for OF
OM	Opening message	To set: OMn<CR> Where: n=0 display the standard default message n=1 display no opening message n=2 display a custom 48-character message defined as follows: OM2 xxx...x
PA	Set delay for power save mode	To set: PAnn<CR> Sets the power save delay time in seconds (nn = 01-99, 00=off) To read: PA<CR> Responds with PAnn (nn = current value in seconds) Note: used on conjunction with PI command
PC	Protect memory channel	To set: PCn<CR> n = 0 (off), n = 1 (on) PC%%<CR> Turns off protection on all channels in the current bank. To read: PC<CR> Response is PCn Note: Use WM command to protect a bank
PD	Delete pass frequency	PDxnn<CR> Deletes pass frequency nn (00-49) in search bank x (A-T or a-t) PDx%%<CR> Deletes all pass channels in bank x (A-T or a-t) Note: The list of pass frequencies is shifted down each time a channel is deleted
PH	Bandscope Peak Hold	To set: PHn<CR> n = 0 (off), n = 1 (on) To read: PH<CR> Response is PHn
PI	Set interval time for power save mode	To set: PInm<CR> Sets interval time in seconds (n=1-9, m=0/5) Example: PI15<CR> Sets power save interval to 1.5 seconds To read: PI<CR> Responds with PIn.n (n.n= current interval value in seconds) Note: used on conjunction with PA command

PP	Set priority channel	To set: PP xnn <CR> Selects channel xnn as the priority channel, where x is a bank A-J or a-j and nn is a channel number To read: PP<CR> Responds with PP xnn
PQ	Wait time for LC2	To set: PQ nn <CR> Sets time nn (00-99 corresponding to 000-990 mS in steps of 10 mS) To read: PQ<CR> Responds with PQ nnn (000-999 mS) Note: <i>This wait time is used as a buffer.</i>
PR	List pass frequencies	PR xnn <CR> Lists the pass frequency stored in pass channel nn of bank x (A-T, a-t or V) PR x <CR> Lists all pass frequencies for bank x (A-T, or a-t, V = VFO) PR<CR> Lists all pass frequencies in the current bank (or the VFO)??? Responds with: PR xnn $fffffff$ Where x = bank, nn = channel, $fffffff$ = frequency (in Hz) Example: PR PRV00 0147455000 PRV01 ---
PW	Write search pass frequency	PW<CR> Write the current frequency to the next available pass channel PW x <CR> Write the current frequency to the next available channel in bank x (A-T, a-t or V=VFO) PW $nnnnnnnnnn$ <CR> or PS $nnnn.nn$ <CR> Adds the frequency $nnnnnnnnnn$ (in Hz) or $nnnn.nn$ (in MHz) to the next available pass channel PW $xnnnnnnnnnn$ <CR> or PS $xnnnn.nn$ <CR> Adds the frequency $nnnnnnnnnn$ (in Hz) or $nnnn.nn$ (in MHz) to the next available pass channel in bank x
QM	Quick Memo	To Read: QM<CR> Responds with ten quick memory frequencies stored within the radio in for the format: QM QM0 RF0086450000 QM1 RF0087310000 QM2 RF0087310000 QM3 RF0000950000 QM4 RF0000750000 QM5 RF0087320000 QM6 RF0087320000 QM7 RF0087320000 QM8 RF0087320000 QM9 RF0087320000 Note: <i>This command is read only</i>
QP	Power Off	QP<CR> Turns off power to the AR-8200 Note: <i>there is no way to turn it on again via RS-232</i>
QS	Delete search bank	QS x <CR> Delete search bank x =A-T or a-t
RF	Set frequency	RF $nnnnnnnm0$ <CR> Tune to the specified frequency (expressed in Hz) RF $nnnn.nnnnm$ <CR> Tune to the specified frequency (expressed in MHz) m must either be '5' (for 50Hz) or '0'. Any other digit is ignored. Note: <i>Frequencies below 3.0MHz are specified in kHz</i>

RX Respond with current data RX<CR>
Recalls current operating parameters in the following formats

VFO mode
VF RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n

2-VFO mode
Vx RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n

VFO search mode
VS Vx RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n

VFO scan mode
VV Vx RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n

Memory manual mode
MR MX_{xnn} MP_n RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n TM_{xxx...x}

Scan mode
MS MX_{xnn} MP_n RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n TM_{xxx...x}

Select scan mode
SM MX_{xnn} MP_n RFnnnnnnnnnn STnnnnnn AU_n MD_n AT_n TM_{xxx...x}

Search mode
SR_x RF

TB	Set Text Description for Bank	<p>To set: TBnxxxxxxxx<CR> Sets the text for bank <i>n</i> (A-J or a-j) to be the 8-character ASCII comment specified TB<CR> or TB%%<CR> Responds with a complete listing of the comments for each bank in the following form: TB MW A:50 TBAAOR Test MW a:50 TBa MW B:50 TBBAOR MW b:50 TBb MW C:10 TBCAOR Test MW c:90 TBc MW D:50 TBDAOR Test MW d:50 TBd MW E:50 TBE MW e:50 TBe TBx<CR> Responds with the text for bank <i>x</i> in the following format: TBA TBAAOR Test</p>
TI	Set priority interval	<p>To set: TInn<CR> Sets priority interval <i>nn</i> (01-19) in seconds To read: TI<CR> Responds with TD<i>nn</i> (<i>nn</i> is current priority interval value expressed in seconds)</p>
TM	Memory Text	<p>To write: TMxxx...x<CR> Where xxx...x is a 12-character ASCII text comment Note: See TT command.</p>
TS	Text Search	<p>TSxxx...x<CR> Searches for the specified text in a memory channel Where xxx...x is a minimum of 2 characters and a maximum of 11 characters of ASCII text comment Note: The more characters specified the faster the search Note: When the text search has completed, <CR> is returned Note: When the RX<CR> command is issued with TS, the relative bank and channel number will be shown</p>
TT	Search Bank Text	<p>To set: TTxxx...x<CR> Where xxx...x is a 12-character ASCII text comment Note: See SE command</p>
VA/VB	Set VFO A - B	<p>To set: Vxnmmmmmm0<CR> (in Hz) or Vxnmm.nmmmm<CR> (in MHz) Where: <i>x</i> is A or B for VFO A or B, frequency data is expressed in the format used by the RF command Vx<CR> Selects VFO <i>x</i> (A or B), there is no data returned from the radio</p>
VF	Select 1-VFO mode	<p>To set: VF<CR></p>
VL	Beep volume level	<p>To set: VL<i>n</i><CR> Where, <i>n</i> = 0 - 9 (0=off) To read: VL<CR> Responds with VL<i>n</i> as above</p>
VR	Firmware Version	<p>To read: VR<CR> Responds with data of the form: VR VR0101</p>
VS		<p>VFO search VS<CR> Starts a VFO based search with limits defined by the frequencies in VFO A & B</p>

VT	VFO auto-store	<p>To set: VTn<CR> Where <i>n</i> is defined as follows: 0 Off 1 On, Auto-store to bank J 2 On, erase bank J To read: VT<CR> Responds with VT<i>n</i> as above Note: VT2 response is equivalent to VT1</p>										
VV	VFO Scan	<p>To set: VVn<CR> Where <i>n</i>=0 (2-VFO mode) or <i>n</i>=1 (VFO scan mode)</p>										
WM	Write Protect Bank	<p>To set: WMxn<CR> Where <i>x</i> is bank (A-J or a-j) and <i>n</i>=0 (protect off), <i>n</i>=1 (protect on) To read: WM<CR> or WM%%<CR> Responds with a listing of 10 banks starting from the last queried bank. Example: WM WM F0 WM f0 WM G0 WM g0 WM H0 WM h0 WM I0 WM i0 WM J0 WM j0</p>										
WP	Write protect enable	<p>To set: WPn<CR> Where <i>n</i>=0 (disabled) or <i>n</i>=1 (enabled) To read: WP<CR> Responds with WP<i>n</i> as above</p>										
XA	Audio scan setting	<p>To set: XAnnn<CR> Where, <i>nnn</i> = 000 (audio scan off), <i>nnn</i> = 001-255 (audio scan value) To read: XA<CR> Responds with XA <i>nnn</i> or XA+<i>nnn</i> (if current voice level >= <i>nnn</i>) Note: Applies to the scan group set by 'GM'.</p>										
XB	Level scan setting	<p>To set: XBnnn<CR> Where, <i>nnn</i> = 0 (level scan off), <i>nnn</i> = 001-255 (level scan value) To read: XB<CR> Responds with XB <i>nnn</i> or XB+<i>nnn</i> (if current level >= <i>nnn</i>) Note: Applies to the scan group set by 'GM'.</p>										
XD	Memory scan delay time	<p>To set: XDnn<CR> <i>nn</i>=00 (off) or <i>nn</i> = 01 - 99 representing 100ms increments (0.1 - 9.9s) To read: XD<CR> Responds with XD<i>n.n</i> as above</p>										
XM	Mode scan	<p>To set: XMn<CR></p> <table border="0" style="margin-left: 20px;"> <tr> <td>0 WFM</td> <td>1 NFM</td> </tr> <tr> <td>2 AM</td> <td>3 USB</td> </tr> <tr> <td>4 LSB</td> <td>5 CW</td> </tr> <tr> <td>6 SFM</td> <td>7 WFM</td> </tr> <tr> <td>8 NAM</td> <td>F All mode</td> </tr> </table> <p>To read: XM<CR> Responds with XM<i>n</i> as above</p>	0 WFM	1 NFM	2 AM	3 USB	4 LSB	5 CW	6 SFM	7 WFM	8 NAM	F All mode
0 WFM	1 NFM											
2 AM	3 USB											
4 LSB	5 CW											
6 SFM	7 WFM											
8 NAM	F All mode											
XP	Free scan pause setting	<p>To set: XPnn<CR></p> <table border="0" style="margin-left: 20px;"> <tr> <td>00</td> <td>pause off</td> </tr> <tr> <td>01-99</td> <td>pause time in seconds</td> </tr> </table> <p>To read: XP<CR> Responds with XP<i>nn</i> as above</p>	00	pause off	01-99	pause time in seconds						
00	pause off											
01-99	pause time in seconds											

Up/Down Increment *n*<CR>
 where *n* is a binary byte value as follows

⇒	0x1c
⇐	0x1d
↑	0x1e
↓	0x1f

(8) AOR PC Windows control software & bandplan editing

A dedicated *PC Windows* package is supplied on CD-ROM with the CC8200 lead, it is also available as a FREE download from the AOR web site **WWW.AORJA.COM**

It is recommended that the AOR software be used should you wish to **edit the automode bandplan data**. The protocol information for bandplan has not been included in the CC8200 command listing as errors written to the Flash-ROM could potentially cause operational problems.

IMPORTANT: When editing the bandplan, the following points must be observed:
 (CC8200 Essential tips you should know before editing the auto-mode)

- Every offset frequency within the auto-mode data is allocated with the specific offset table number. These numbers are used for editing the auto-mode data. Therefore you are required to obtain the offset table data prior to commencing the edit. (Get from AR8200)

After starting the program,
 select {File} {New} {Auto Mode File},
 select {Edit} {Add Item} or {Modify Item},
 and click {Edit offset table}.
 Click {Get} followed by {X} to exit.
 Then select {Get from RX} to download the offset table data.

The offset table must be renewed by pressing the {Send} in the {Edit offset table} each time the offset frequency has been deleted/added.

- The auto-mode data is an important ingredient which is vital to the CPU brain work of the AR8200! Any incorrect data which may have been introduced in the course of editing will affect the operation of the receiver.

1. Always allocate the change-over frequencies from lower to higher in order. A change-over frequency will work as cut-off frequency to separate the different receive mode, step size, etc used from one segment of auto-mode to another. Therefore if the change-over frequencies have been written high and low at random the AR8200's CPU is unable to find the change-over frequency required. Unless this condition is met you are unable to edit the auto-mode data correctly.

2. A change-over frequency must be divisible by the step size of both ends (must be an even number without decimal point). If not divisible, the change-over frequency will be forced to move (migrate) in an unstable manner every time the receiver is tuned over the change-over frequency up and down.

Ignore the step-adjust frequency when the step-adjust is applied.

Where non-divisible change-over frequency is unavoidable use a stop gap method as shown below:-

Frequency	Step size	Description
459.500	25	Lower change-over frequency
462.475	5	Adjusted change-over frequency
462.480	240	Desired change-over frequency and step size
464.880	20	Adjusted change-over frequency
464.900	12.5	Desired change-over frequency and step size

Such adjusted change-over frequencies may be found within the factory auto-mode data.

3. Make sure you reset the CPU.

Unplug the external power and remove a battery cell to allow the CPU to reset. This is required to force the flag within the CPU and the contents of the flash ROM to become consistent/identical. Without the CPU reset some malfunctions may be encountered.

4. Rewriting the memory

Old memory channel data such as frequency, receive mode, step size (prior to editing) may still be found valid in some memory channels. This will cause conflict between new auto-mode data and old memory channel data. Rewrite the memory channels using the new auto-mode to resolve such conflict.

Installing the software

To install the AOR software run the INSTALL.EXE program from the CD-ROM (**x:\English\CC8200\cont-soft\install.exe** where 'x' is your CD-ROM drive letter). If installing from a web download, expand the ZIP file into a temporary directory on your hard drive then run the INSTALL.EXE

A directory will be created on your hard drive along with a program group from the START/PROGRAMS button of the desktop.

This software package will also provide additional facilities such as memory channel & search bank editing, spectrum display and a record-to-disk sound utility.

(9) Acknowledgements

This manual has been compiled by AOR UK LTD using materials supplied by AOR Japan. The original compilation was by Simon Collings G4SGI whom we wish to thank.

The software package was created for AOR LTD by Simon Collings G4SGI.

Thanks to AOR LTD, AOR UK LTD, Javiation and Simon Collings for final beta-testing of the software.

All trade marks acknowledged (such as Microsoft, Windows, IBM etc).

Please refer to the AOR web site for updates on this file and the AR8200 Windows PC software.

(10) Contact details

AOR Ltd, 2-6-4 Misuji, Taito-Ku, Tokyo 111-0055, Japan
Tel: +81 3 3865 1695
Fax: +81 3 3865 1697
post@ajorja.com www.ajorja.com

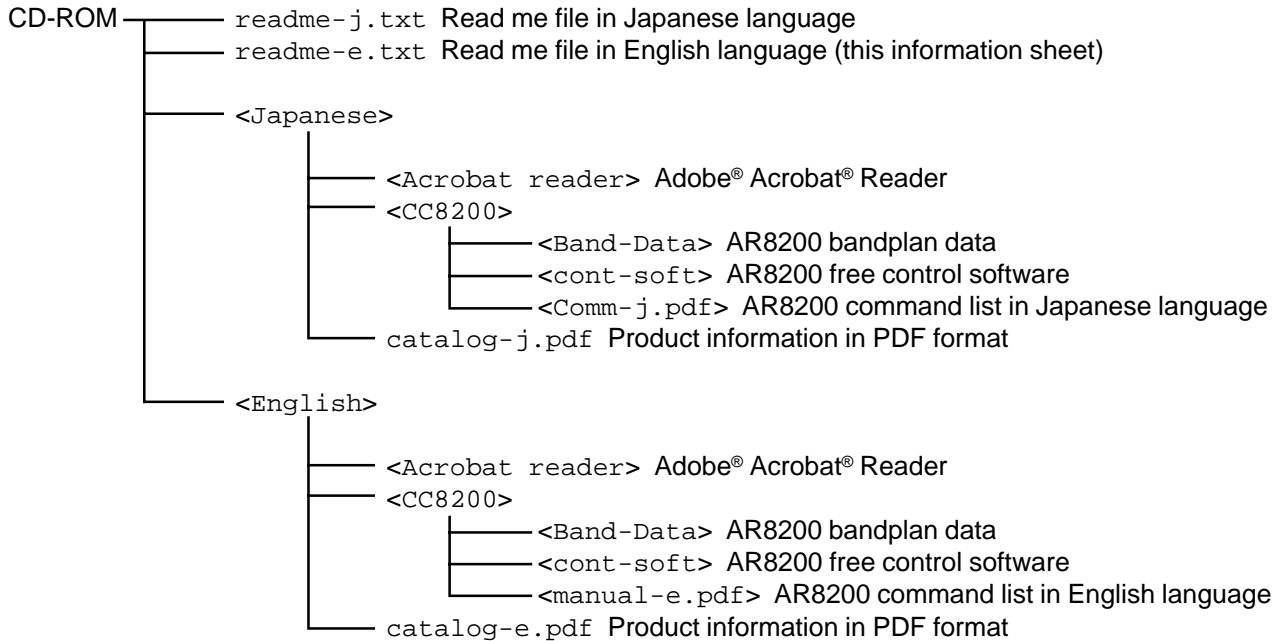
AOR (UK) Ltd, 4E East Mill, Bridgefoot, Belper, Derbys DE56 2UA, England
Tel: +44 1773 880788
Fax: +44 1773 880780
info@ajor.co.uk www.demon.co.uk/ajor

AOR USA, INC. 20665 S.Western Ave., Suite # 112, Torrance, CA 90501, USA
Tel: (310) 787 8615
Fax: (310) 787 8619
info@ajorusa.com www.ajorusa.com

CC8200 - AR8200 REMOTE CONTROL

Thank you for purchasing the CC8200.

This CD-ROM is supplied with the CC8200 and contains the following data in both Japanese and English languages. Should you wish to use English language, please select the files under <ENGLISH>, should you wish to use Japanese language, please select the files under <JAPANESE>.



Regarding the AR8200 control software

Please ensure prior to operating the control software that you **understand and accept** the following conditions:-

- This software is available free of charge.
 - Copyright and intellectual property rights are owned by AOR as the software author.
 - Any attempt to alter the software is subject to copyright infringement.
 - Any attempt to “do what the author prohibits” (refer to help) is subject to copyright infringement.
 - No liability is accepted for any inconvenience or damage caused by use of the software.
- AOR LTD holds no liability for:-**
- The author is not liable to correct or remedy any inconvenience or requests from the user.
 - No specific support is available from AOR LTD.

Regarding the supply of Adobe® Acrobat® Reader

Adobe® Acrobat® Reader is available free of charge to those who need to write, read and search in PDF format irrespective of whether within or outside of the company. Acrobat® Reader 3.0 is available for unlimited use or distribution provided you attach a copy of warning regarding the electronic end-user licence agreement, related copyright and other ownership agreement.



AOR LTD
2-6-4 Misuji
Taito-Ku
Tokyo 111-0055
Japan
e-mail: post@aoija.com

Japanese language
Tel: 03 3865 1681
Fax: 03 3862 9927
www.aorja.com/index-j.html
© 1998.9.2, AOR LTD

English language
+81 3 3865 1695
+81 3 3865 1697
www.aorja.com
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