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RAMS

REMOTE AUDIO MONITORING SYSTEM

Operations Manual

First Edition
December 1993

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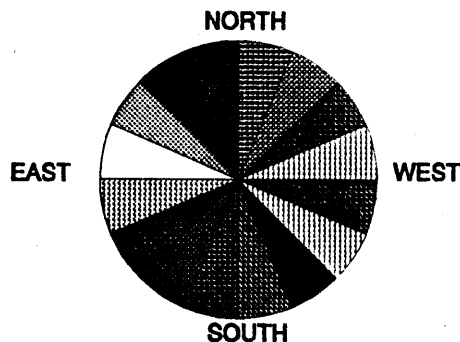
Operation of the Remote Audio Monitoring System "RAMS"

1 - DESCRIPTION

The Remote Audio Monitoring System(RAMS) is a radio spectrum surveillance tool, which can be controlled remotely. Control of the system is achieved via two methods, the first is via a normal telephone line using tone signals (DTMF) , and the second method is via computer/modem utilizing either 1200 or 2400 baud.

In the telephone mode the user controls the system via the keypad on their phone. When the operator sends a command, it is echoed by the system using on board speech synthesizer. The commands available are as follows:

- a)- Complete control over the receiver frequency, from 25 to 1000MHz, the modulation modes, and the band(AM,FM etc).
- b)- Obtain radio direction findings via the doppler system. RAMs provides 16 direction indications(ie north, north-west, south-west etc).



- c)- Control of an audio tape deck to record audio output from the receiver. Practically all normal tape control functions are available via the telephone ie set up a recording session(start and stop),rapid rewind, listen to tape, rewind to start of tape etc. The second track of the tape is used to record the date and the time of the recording. As the system is voice activated, many hours of monitoring can be compressed into one tape.
- d)- Control of the transceiver unit. The user can control the frequency as well as transmit and receive via the system.

When being controlled via the computer/modem interface, the operations of the system are driven via an on screen menu. The following commands are available:

- a) Set up a frequency scanning table (maximum 20 channels) using 25 to 1000MHz. Schedule a scanning session with different start times and dates. Read the frequencies currently set up in the configuration. Upload scanning data to the local terminal.
- b) Read and adjust system time and date.
- c) Terminate and stay resident, with control via the telephone (DTMF).

Note:

The information accumulated by the system during a scanning session, will not be lost if the system power should fail. The memories are powered by internal batteries. Normally the interrupted scanning session can be reactivated manually, when power is restored. See section 2 and 3 for further details.

2 - CONTROL OF RAMS VIA COMPUTER

It is possible to communicate with RAMs using standard communication software programs, a modem (1200/2400 baud) similar in speed to the systems. Communication protocol uses 8 data bits, 1 stop and no parity. In a program such as PROCOMM, this configuration can be accessed via the a sub menu titled "Line Settings" (Alt-P), by choosing number 9.

When communication with RAMs is established the following banner will appear:

```
*****
*
*           Welcome to RAMs V3.0       Date, Time           *
*
*****
```

Press enter to continue

Enter Access Code (ie TODAY) (must be upper case letters only)

Note: Should RAMs not respond with a menu to the preceding input, enter a "?", and the menu should appear.

The following menu should appear on the users screen:

******* RAMs SYSTEM COMMAND MENU *******

- 1 - Enter New Frequencies*
- 2 - Read Current Frequencies in Memory*
- 3 - Prepare a scanning session*
- 4 - Download Scanning Data*
- 5 - Set up an audio recording session*
- 6 - Terminate a scanning or recording session*
- 7 - Read current time and date*
- 8 - Set system time and date*
- 9 - Switch to DTMF mode*
- 10- Exit*

The system is in IDLE mode

Enter command (? for the menu)

Note: At all times when the system displays "Enter a command"(? for the menu): you are at the main menu, and the users selection is a number from 1 to 10 or "?" to redisplay the menu on the display screen. If you have terminated the session, you must send a command to your modem to hang up. If you are using PROCOMM, this is achieved by pressing "Alt H".

OPTION 1 Modify the Scanning Session Table

The system first requires the user to enter the first channel number to be modified, then the user is prompted for the last channel to be modified. Subsequently the user will be requested to enter the new frequency for the start channel, automatically incrementing the channel number until the last channel number is reached. In this manner all 20 channels can be modified, or only just a portion of the channels.

In the following example, the user is preparing a scanning session for the frequencies 152.060, 159.120, and 164.010 MHz. These frequencies will be entered into channels 8, 9 and 10 of the scanning table. The scanning session will be scheduled to start on the 20th Oct 1991 at 08:30h.

Enter the first channel to be modified(1 - 20 or 50): 8

Enter the last channel to be modified(1 - 20): 10

Enter a frequency for channel 8: 152.060

Enter a frequency for channel 9: 159.120

Enter a frequency for channel 10: 164.010

Enter a command (? for the menu)

Note: Channel 50 is reserved for the audio recording session.

OPTION 2 List Current Frequencies in Memory

With this command the system will display a list of frequencies currently programmed into the systems memory. This option is extremely useful to verify that the exact frequencies which the user has previously input, have been properly stored.

Channel 1: 144.3750
Channel 2: 148.0800
Channel 3: 150.2250
Channel 4: 168.0600
Channel 5: 163.0400
Channel 6: 165.0400
Channel 7: 164.0300
Channel 8: 152.0600
Channel 9: 159.1200
Channel 10: 164.0100
Channel 11: 465.5500
Channel 12: 466.5000
Channel 13: 469.7000
Channel 14: 469.7300
Channel 15: 851.6275
Channel 16: 855.2275
Channel 17: 865.7875
Channel 18: 871.2225
Channel 18: 872.1175
Channel 19: 874.2375
Channel 20: 876.2345

Channel 50: 162.5500

OPTION 3 Prepare a Scanning Session

In order to prepare the system for a scanning session, it is assumed that the user has already set up the required frequencies in the channel table using "Option 1" . When selecting this menu item, the user will be requested to enter the first scanning channel number, and then will be asked for the ending channel number.

Enter the first channel to scan (1-20)?: 8

Enter the last channel to scan (1-20)?: 10

The system will then proceed to list on the screen the selected frequencies to be scanned, comprising the start and ending channels. The user will be asked to confirm that these are valid frequencies for the scanning session.

ie

Channel 8: 152.0600

Channel 9: 159.1200

Channel 10: 164.0100

Are these the desired channels for the scanning session (Y/N)? 0

(" N " You will returned to the main menu)

Enter a command (? for the menu):

(" Y " Permits continuation of the scanning session)

Start the Scanning Session Immediately(Y/N)? N

(" Y " Immediately starts the scanning session)

(" N " Permits the user to enter a different date and time for the start of the scanning session)

Enter the Start Time and Date:

Enter the hour (0-23): 8

Enter the minutes (1-59): 30

Enter the day of the month (1-31): 20

1 - Jan 2 - Feb 3 - Mar 4 - Apr 5 - May 6 - Jun

7 - Jul 8 - Aug 9 - Sep 10 - Oct 11 - Nov 12 - Dec

Enter the Month (1 - 12): 10

Enter the Year (0 - 99): 1992

Scanning set to begin on : 20 oct 1992 08:30

Enter a command (? for the menu):

The system will now wait for the programmed time and date to start the scanning session, and return the user to the beginning, to permit additional changes.

Note: Options 1, 2, 3 and 5 are no longer available at this point. If these options need to be accessed, the user must first select Option 6, to terminate the scanning session.

If an unavailable option is requested by the user because a scanning or recording session is active, the system will respond with the following message:

Command is not available during programmed scanning session

Enter a command (? for menu)

OPTION 4 Extract The Results of a Scanning Session

On selection of this option, the system will request the user to prepare for the transfer of the information, the following message will appear on the screen.

Prepare for the transfer, then press enter

At this point the user should prepare their communication software to receive an ASCII file. If using PROCOMM, the results can be imported as follows:

Select	Page Down
Protocol	ASCII
FILENAME (ex.)	C:\CONTROL\RAMS\QUE11020.RES
Select	Return

When the received data finishes appearing on the screen, press the escape key "Esc". The received file can now be analyzed using the software package QCCLAN.

Note: Partial results of a scanning session can be extracted without stopping a session via Option 4. To terminate a session and extract the results, end by selecting Option 6, and extract the results with Option 4.

OPTION 5 Prepare an Audio Recording Session

To prepare the system to record an audio channel , Channel 50 of the scanning table is utilized. The following user response is required.

Channel 50: 162.5500

Is this a valid frequency (Y/N)? N

(" N " This will return the user to the main menu, were a valid frequency can be entered by selecting Option 1)

Enter the first channel to modify (1-20 OR 50): 50

Enter the frequency for channel 50: 156.8000

Enter a Command (? for the menu): 5

Channel 50: 156.8000

Is this a valid frequency (Y/N)? Y

(" Y " this permits the user to continue with the audio recording menu, which will display:)

Start the recording session immediately (Y/N)? N

(" Y " This will immediately start the recording session via voice activation from the source.)

(" N " will present the user with an additional menu, to permit setting of the date and time, an will be displayed as follows:)

Enter the starting hour and date for the recording session:

Enter the Hour (0 - 23): 10

Enter the Minutes (0 - 59): 30

Enter the Day of the Month (1 - 31): 25

*1 - Jan 2 - Feb 3 - Mar 4 - Apr 5 - May 6 - Jun
7 - Jul 8 - Aug 9 - Sep 10 - Oct 11 - Nov 12 - Dec*

Enter the Month(1 - 12): 10

Enter the Year (0 - 99): 1991

The recording session is set up for : 25 oct 1991 10:30

OPTION 6 Terminate a Scanning or Recording Session

The system will require the user to verify the termination of any scanning or recording session currently in progress. The following screen messages will be displayed.

If a scanning session is in progress:

Stop the Current Scanning Session (Y/N): Y

(" Y " this will immediately stop any current scanning session, and return to the main menu)

(" N " do not stop the scanning session, and return user to the main menu)

If an audio recording session is in progress:

Stop the Current Recording Session (Y/N)? Y

(" Y " stop the recording session and return the user to the main menu)

(" N " do not stop the current recording session and return the user to the main menu)

If neither a scanning or recording session is in progress, the system will respond with the following message, and simply return to the main menu.

The system is idle

Enter a command (? for the menu):

OPTION 7 Display Time and Date

The current system date and time will be displayed on the screen.

Time and Date : Thur 20 Oct, 1991 09:10:22

Enter a command (? for the menu):

OPTION 8 Set System Time and Date

This option permits the user to adjust the system time and date ,should the user find it incorrect when using Option 7.

To adjust the date and time to Tuesday 8 October 1991 , at 13:22:30 hrs, following the procedure below.

1 - Sun 2 - Mon 3 - Tues 4 - Wed 5 - Thur 6 - Fri 7 - Sat

Enter the day of the week: 3

Enter the day of the month (1 - 31): 8

*1 - Jan 2 - Feb 3 - Mar 4 - Apr 5 - May 6 - Jun
7 - Jul 8 - Aug 9 - Sep 10 - Oct 11 - Nov 12 - Dec*

Enter the month(1 - 12): 10

Enter the year (0 - 99): 1991

Enter the hour (0 - 23): 13

Enter the minutes (0 - 59): 22

Enter the seconds (0 - 59): 30

New time and date : Tues 8 Oct, 1991 13:22:30

3 - CONTROL OF RAMS VIA TELEPHONE (DTMF)

When the user accesses **RAMs** via telephone, **RAMs** responds with "HELLO". The operator has five(5) seconds to press the "*" key on the phone keypad, after this period **RAMs** is put into the computer control mode and awaits users commands.

When the " * " is transmitted the **RAMs** will respond with " ENTER ACCESS CODE ". The access code is : (4762). As each character is entered ,it is echoed back to the user. At the end of the echo response the user should enter the next digit in the access code. Access codes may vary, please check supplied documentation to determine the appropriate code.

If the entered access code is correctly received, **RAMs** will respond with "IDLE MODE, MAIN MENU , ENTER COMMAND". An audio listing of the control options can be obtained by pressing the "*" key. Pressing the "#" key will terminate the listing.

Control Options Menu

- 1 - RECEIVER CONTROL SUB-MENU
- 2 - TAPE CONTROL SUB-MENU
- 3 - TRANSCEIVER CONTROL SUB-MENU
- * - AUDIO MENU
- # - DISCONNECT ----->
- * - SWITCH TO MODEM MODE
- # - QUIT & HANG UP PHONE

If a " 1 " is pressed from the control menu, **RAMs** will respond with "Enter Receiver Command". An audio listing of the commands can be obtained by pressing " * " (press " # " to stop the listing).

1- Receiver Control Sub Menu

1 - ENTER NEW FREQUENCY

2 - ENTER NEW MODE ->

- 1 - FM NARROW
- 2 - FM WIDE
- 3 - AM
- 4 - SSB

3 - REPORT FREQUENCY/MODE

4 - REPORT BEARING -->

A report every 5 seconds.

To end reports every 5 seconds.

0 - Listen to Receiver ----> # To stop

(Listening mode will terminate after 1 minute if there are no keys pressed)

* - AUDIO MENU

- RETURN TO CONTROL MENU

Note: The direction finder is activated when 4 is pressed , however it takes about 20 seconds for the unit to stabilize. It can be disconnected by pressing # after taking a reading.

From the main control menu ,if " 2 " is entered, **RAMs** will respond with " ENTER TAPE COMMAND". An audio listing of the tape commands obtained by pressing " * ". Pressing " # " will stop the listing.

2 - Tape Control Sub Menu

- 0 - LISTEN TO AUDIO INPUT, " # " TO STOP
(LISTENING MODE IS TERMINATED AFTER 1 MINUTE ,WITH NO KEY INPUT)
- 1 - RECORD(from beginning of tape)
- 2 - RECORD (from current position)
- 3 - REWIND AND PLAY
- 4 - FAST REWIND -----> " # " to stop tape
- 5 - PLAY FROM CURRENT POSITION -> " #" to stop tape
(PLAY MODE IS TERMINATED AFTER 3 MINUTES, WITH NO KEY INPUT)
- 6 - FAST FORWARD ---> " # " to stop tape
- 7 - TIME AND DATE OF THE RECORD
- 8 - STOP RECORDING
- * - AUDIO MENU
- # - RETURN TO CONTROL MENU

Note: To get an audio report on the TIME AND DATE OF THE RECORD (Option 7), the user should return to the control menu by pressing "#" to stop the tape and return to the tape control menu. Press key "7" to obtain the recorded time of the last record. After receiving the message, press 5 to continue listening to the tape. Time and date are recorded every twenty(20) seconds on the second channel of the tape. The time and date the user receives are those for the last record.

From the main control menu , If a " 3 " is entered from the control menu, **RAMs** will respond with "ENTER TRANSCEIVER COMMAND". An audio listing of the available commands can be obtained by pressing " * " . Press " # " to stop the listing.

3 - TRANSCEIVER CONTROL SUB MENU

1 - TRANSCEIVER SET UP

- a) RX FREQUENCY (6 digits)
- b) TX FREQUENCY (6 digits)
- c) RX (CTCSS) TONE (2 digits)
- d) TX (CTCSS) TONE (2 digits)

2 - ENTER TRANSCEIVER MODE -->

1 - Transmit

0 - Receive --> "#"RETURN TO MENU

0 - LISTEN

* - AUDIO MENU

- RETURN TO CONTROL MENU

Note: Pressing the "*" key during the transceiver set up menu (Option 1) at any prompt will generate an "Input Error Message", and return the user to the transceiver control menu. Pressing "#" will select a 0 entry and skip to the next parameter, except at the RX frequency prompt. A receive frequency must be entered. For simplex operation, press "#" at the TX Frequency prompt. If a transmit frequency is entered, the Tx/Rx offset frequency will be calculated and entered into the transceiver.

(In the Annex there is a listing of the CTCSS tones.)

DTMF Control Options - Flow Chart

Control options menu

- 1 - RECEIVER CONTROL SUB-MENU
- 2 - TAPE CONTROL SUB-MENU
- 3 - TRANSCEIVER CONTROL SUB-MENU
- * - AUDIO MENU
- # - DISCONNECT ----> # - TO CONFIRM OR
(ANY OTHER KEY TO CONTINUE)

Receiver control sub-menu

- 1 - ENTER NEW FREQUENCY
- 2 - ENTER NEW MODE ----->
- 3 - REPORT FREQUENCY/MODE
- 4 - REPORT BEARING --> # SINGLE
* CONTINUOUS
BEARINGS
- 0 - LISTEN -----> # TO STOP # - RETURN TO RECEIVER
- * - AUDIO MENU
CONTROL MENU
- # - RETURN TO CONTROL MENU

- 1 - FM NARROW
- 2 - FM WIDE
- 3 - AM
- 4 - SSB
- * - AUDIO MENU

Tape control sub-menu

- 1 - RECORD MODE
- 2 - RECORD FROM CURRENT POSITION
- 3 - REWIND AND PLAY
- 4 - FAST REWIND -----> '#' TO STOP TAPE
- 5 - PLAY FROM CURRENT POSITION ---> '#' TO STOP TAPE
- 6 - FAST FORWARD -----> '#' TO STOP TAPE
- 7 - REPORT TIME AND DATE
- 8 - STOP RECORDING
- 9 - TOGGLE TIME TRACK AUDIO INDICATOR (ON/OFF)
- 0 - MONITOR TAPE
- * - AUDIO MENU
- # - RETURN TO CONTROL MENU

Transceiver control sub-menu

- 1 - TRANSCEIVER SET UP
- 2 - ENTER TRANSCEIVE MODE --->
- 0 - LISTEN
- * - AUDIO MENU
- # - RETURN TO CONTROL MENU

- 1 - TRANSMIT
- 0 - RECEIVE --> # - TO
RETURN TO TRANSCEIVER
CONTROL MENU

IBM/PC Control Menu

***** IRMA SYSTEM COMMAND MENU *****

- 1 - ENTER NEW FREQUENCY
- 2 - READ CURRENT FREQUENCIES
- 3 - SET UP LOADING SESSION
- 4 - DOWNLOAD SCANNING DATA
- 5 - SET UP AUDIO RECORDING SESSION
- 6 - TERMINATE SCANNING OR RECORDING SESSION
- 7 - READ CURRENT TIME/DATE
- 8 - SET TIME/DATE
- 9 - DISCONNECT

SYSTEM IS IN IDLE MODE

4 - SITE CONSIDERATIONS FOR RAMS

Prior to setting up the RAMs unit, the user should verify access to a telephone line and AC power at the proposed site. The unit should not be installed in areas where excessive temperature, humidity or vibration exist. It is recommended that a DTMF phone be part of the set up package, to ensure proper operation of the unit prior to leaving the site location.

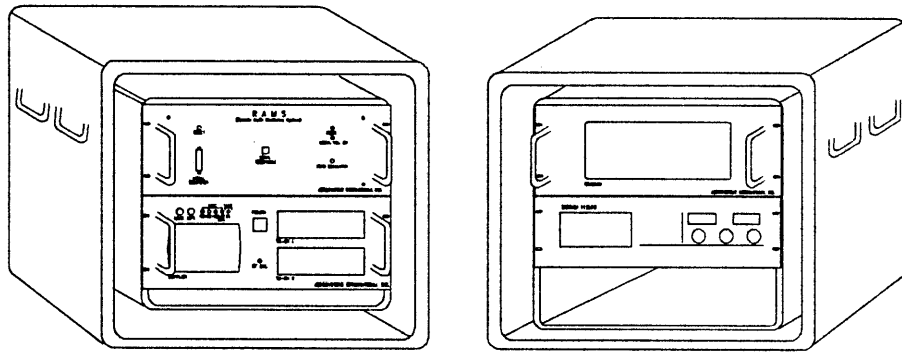
The RAMS power supply system is split into two elements. The controller/Tape Deck/Receiver are on one circuit, thus permitting these functions to be supported by a UPS. The DF module has an AC receptacle marked "**UPS INP**". On/OFF power control of this section is controlled by the UPS On/OFF switch. If UPS support is not required, this input should be connected to a power bar featuring its own On/OFF switch. The "**PWR INP**" input supports the Doppler/Transceiver and modem power supplies. The front panel mounted power switch on the DF unit controls AC power to only these systems.

a) Installing the RAMs System

The system is normally provided in two equipment cases, which may be stacked one above the other. Normally the unit containing the controller is placed on top, P/N 1400-1.

RAMS

Remote Audio Monitoring System



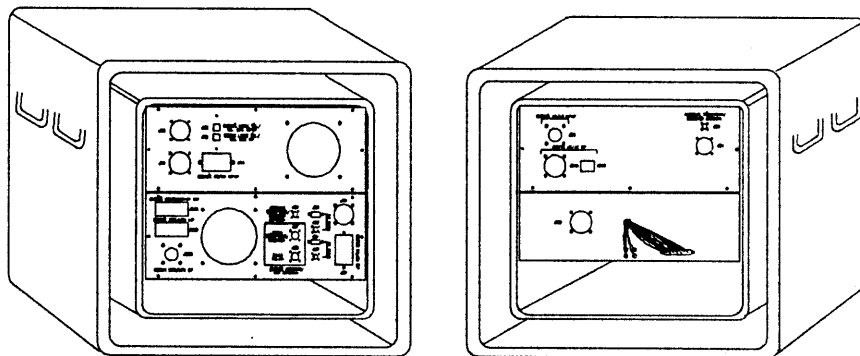
P/N 1400-1

P/N 1400-2

Rear View of System :

RAMS

Remote Audio Monitoring System



P/N 1400-1

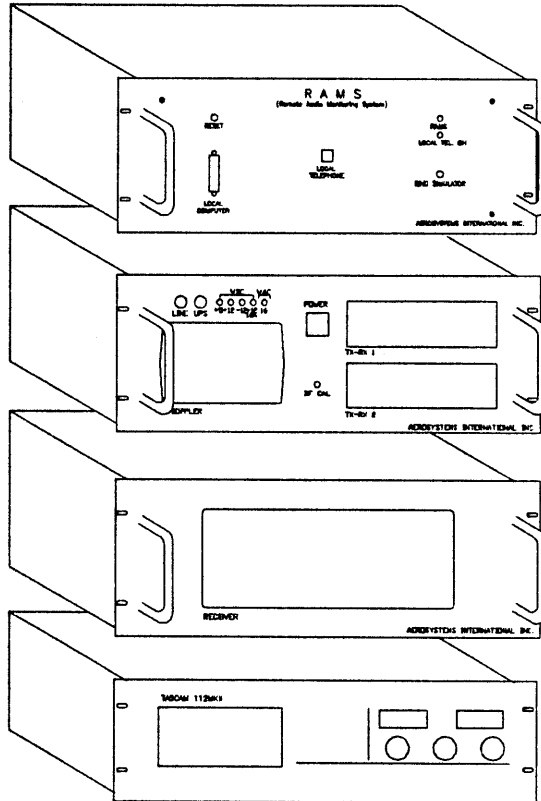
P/N 1400-2

The receiver, tape deck, DF, transceiver and the controller form the major elements of the system. The supplied cables are used to provide interconnects between the various modules and the controller.

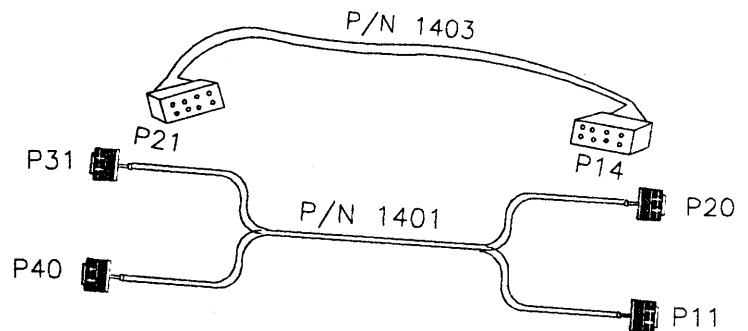
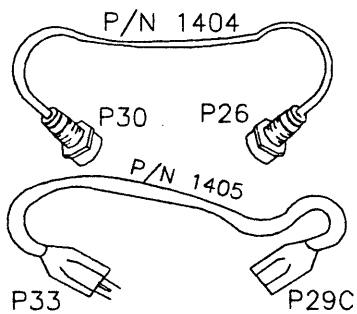
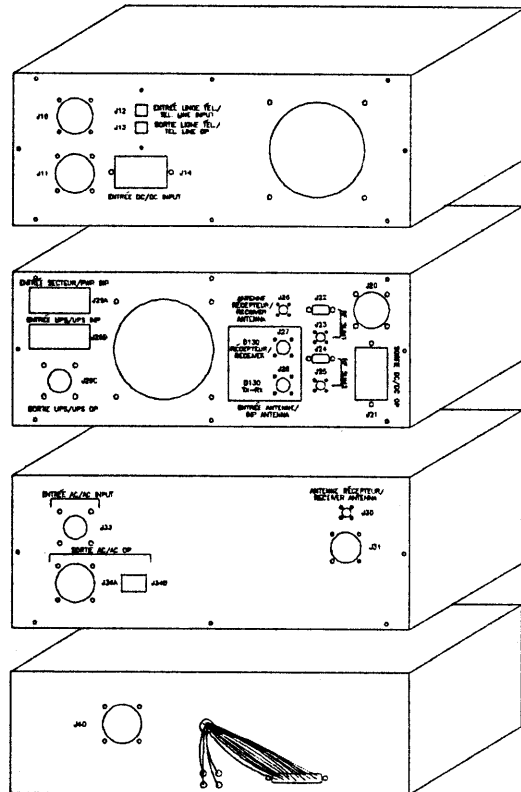
RAMS

Remote Audio Monitoring System

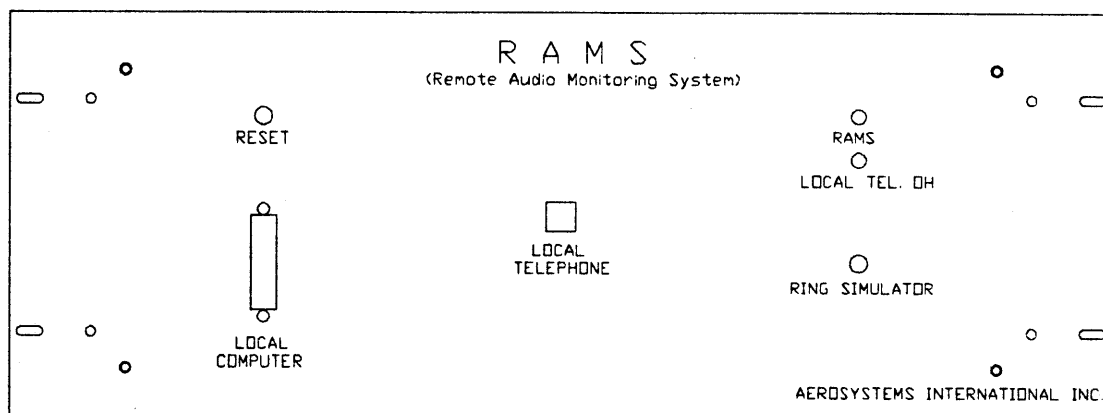
Front



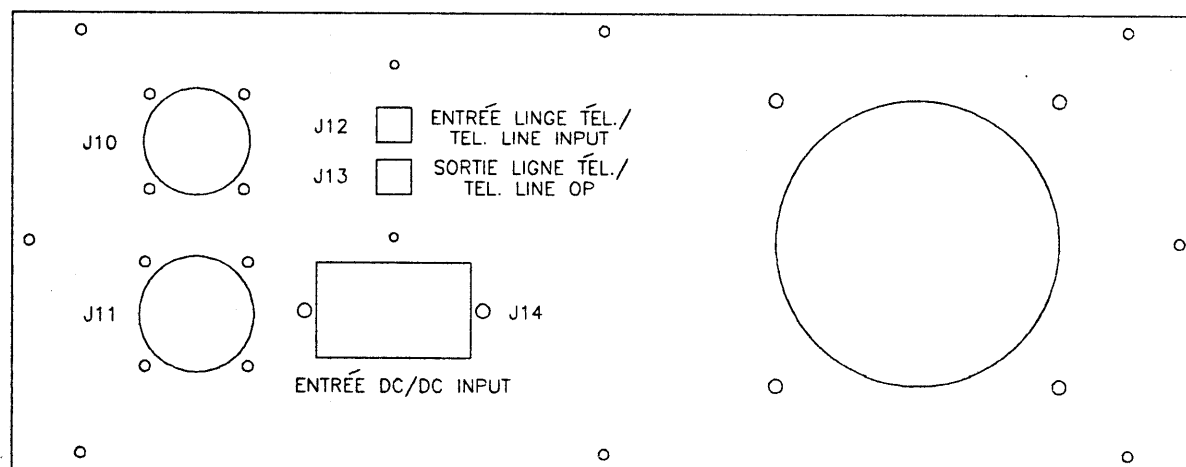
Rear



In the first instrument case the user will find the **CONTROLLER** unit, with the second unit containing the **DOPPLER UNIT** , **TRANSCIVER UNIT** as well as the various **POWER MODULES** (controller, transceiver, doppler and modem).

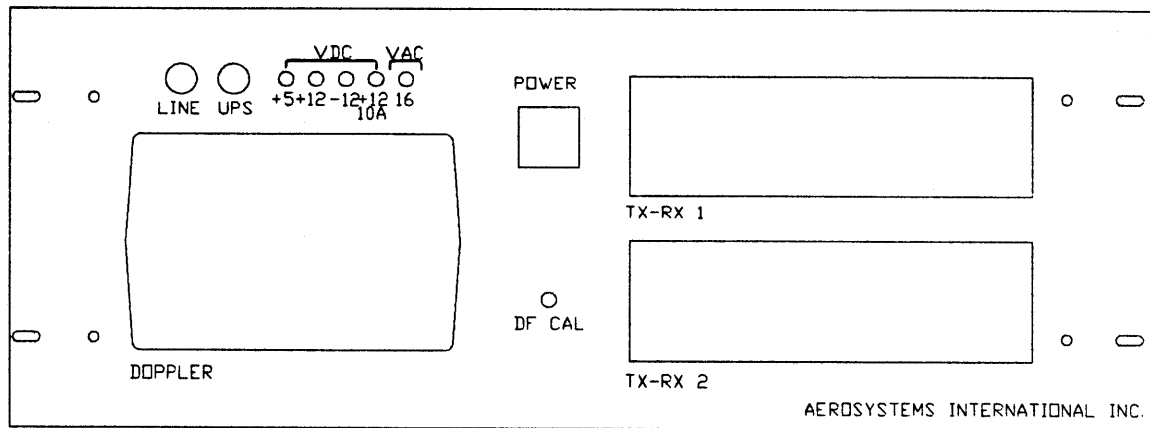


CONTROL BOX - FRONT PANEL

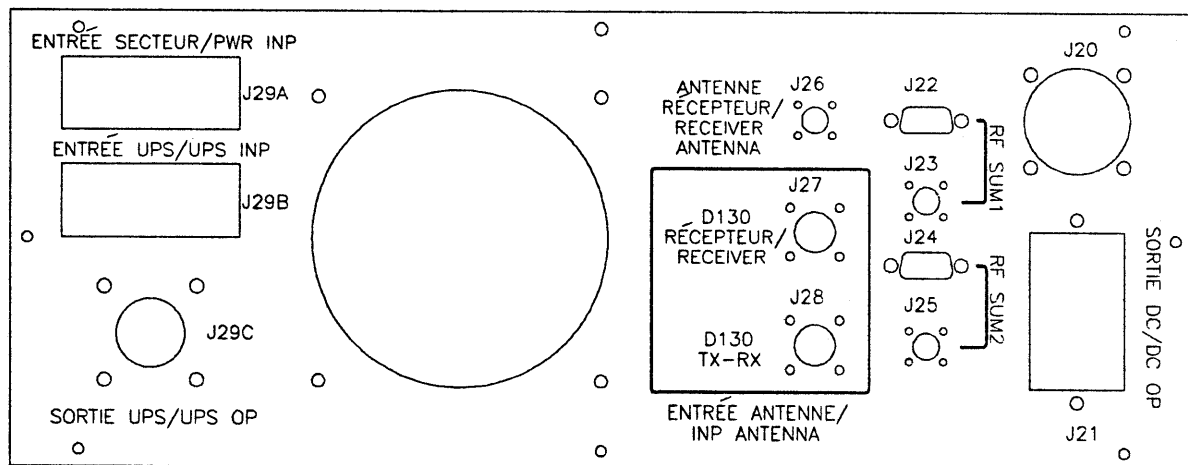


CONTROL BOX - REAR PANEL

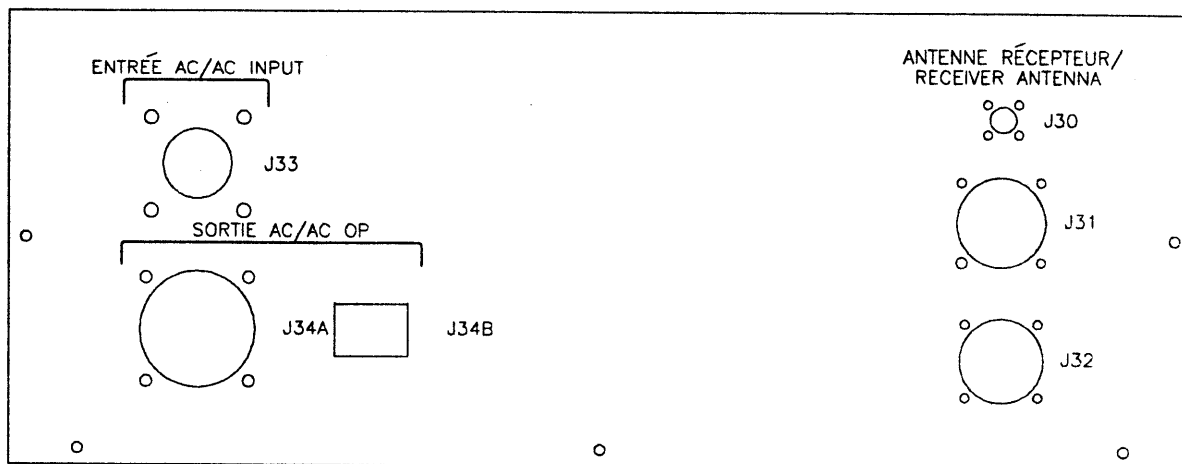
In the second case is found the receiver and tape deck units.



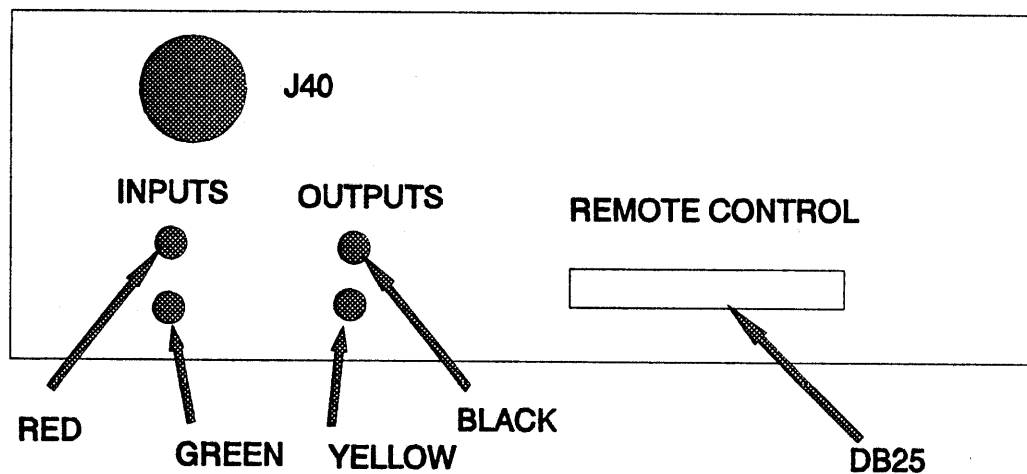
DF - FRONT PANEL



DF - REAR PANEL

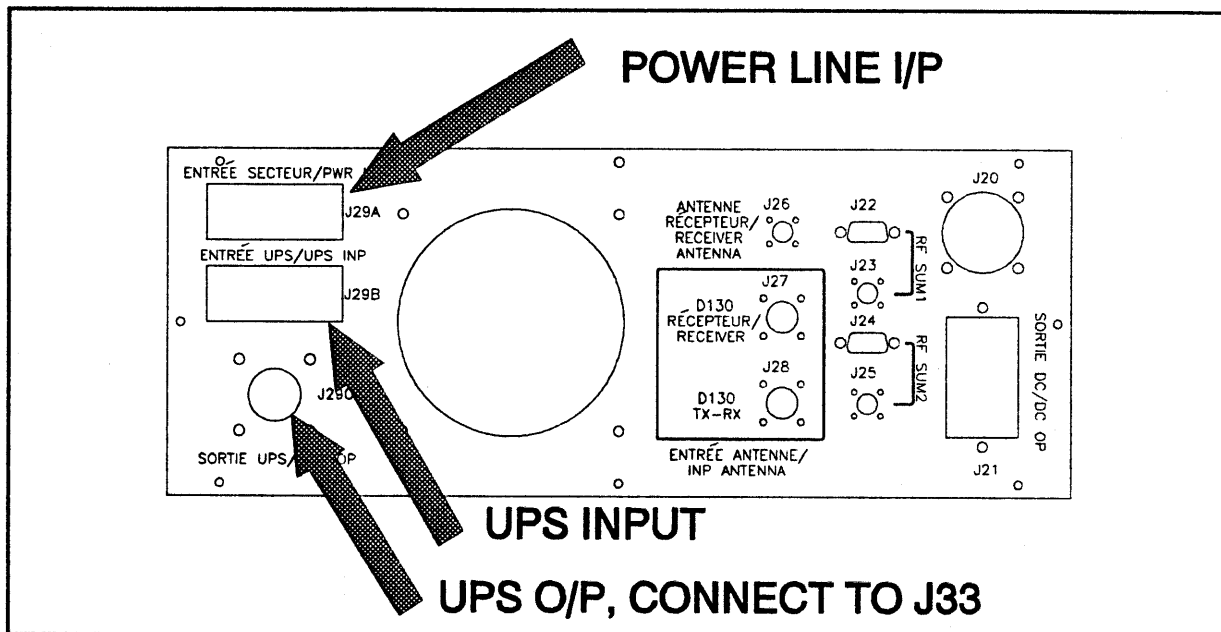


RECEIVER - REAR PANEL



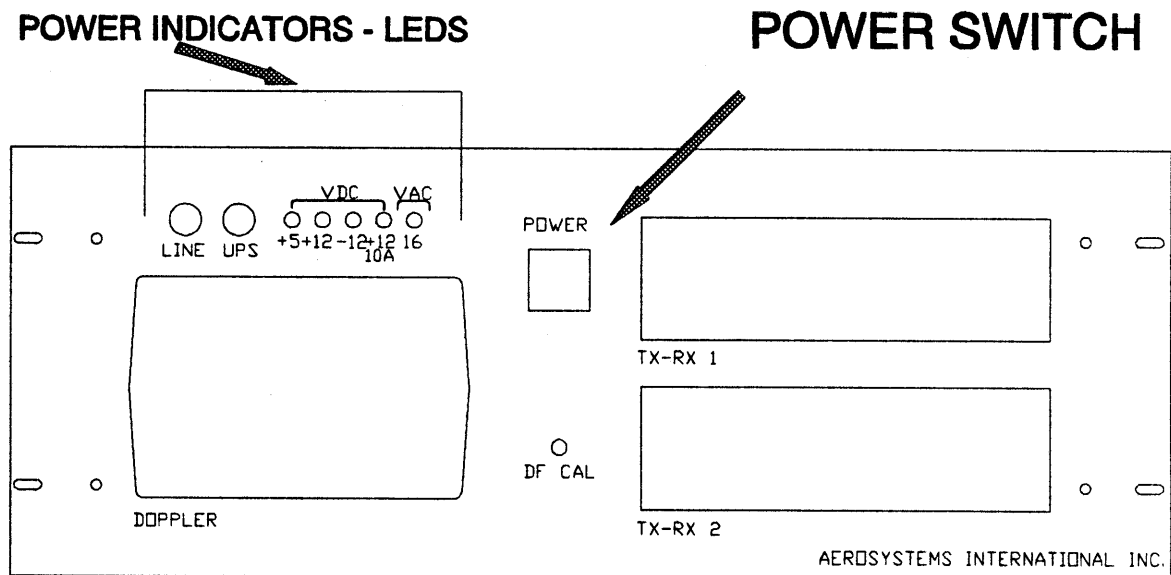
TAPE DECK - REAR PANEL

As RAMs is capable of accepting different voltage inputs, verify that the unit is configured for the local voltage. Voltage selection can be achieved by removing the small PCB from the power entry module, and rotating it accordingly. Verify the UPS input voltage is also correct if a UPS is being used.

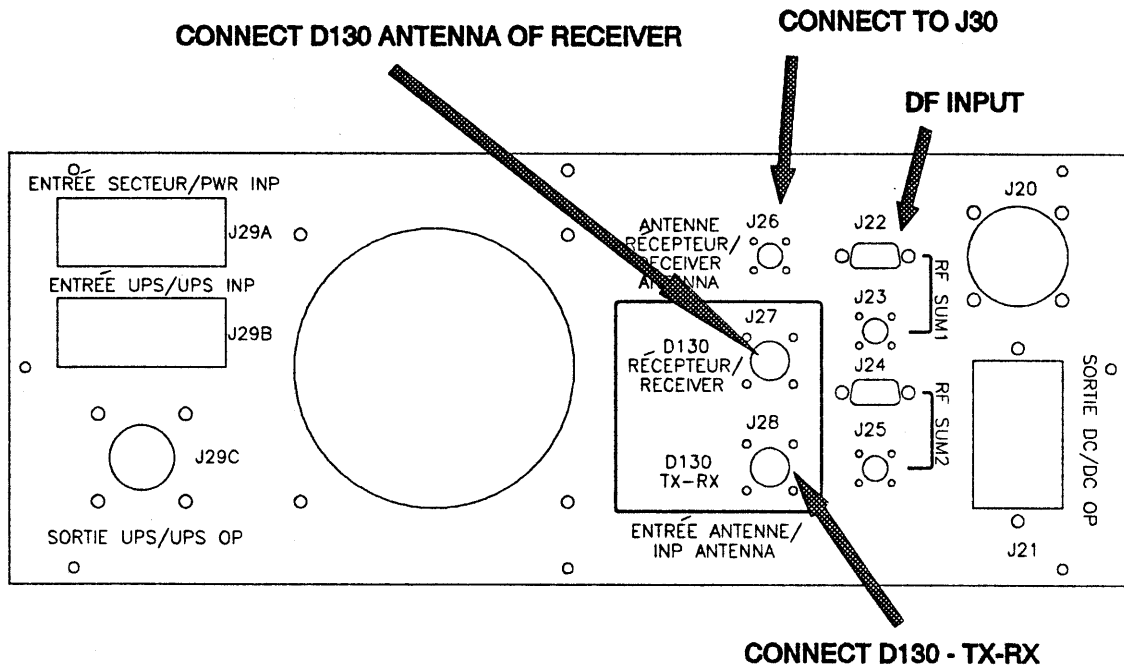


- 1- Connect **J29C** on the rear of the power module , to **J33** on the rear panel of the receiver module, using cable P/N 1405.
- 2- Connect the Discone D130 antenna for the receiver to **J27**, an the antenna for the transceiver, if installed to **J28** on the rear of the power module. Connect **J26** to **J30** on the rear of the receiver unit, with P/N 1404.
- 3- Similarly connect the summer from the Doppler antenna to **J23**(RF SUM1) and the DB9 connector of the summer to **J22**(RF SUM1).
- 4- Connect the DC power output **J21** , to **J14** on the rear of the controller module P/N 1403.
- 5- Connect the site telephone line to **J12** on the rear of the controller module.
- 6- Using cable P/N 1401, connect **J11**(back of controller), **J20**(back of power module) , **J31**(back of receiver) and **J40**(back tape deck).
- 7- If a UPS is being used, connect its output to (**J29B**) , on the rear of the power module. Otherwise connect line voltage to this location.

- 8- Connect line voltage directly to **(J29A)** , verify the input voltage selection is correct.
- 9- Verify that the tape deck audio I/O wires are properly installed on the rear of the unit, in accordance with the illustration located nearby.
- 10- To start the system , turn on the **"UPS"** or power bar via its own switch, and press the green button marked **"POWER"** on the front of the power module. The indicator lights on the front panel should illuminate, per the following diagram.



DF - FRONT PANEL



Verify that the tape deck and receiver are powered up, and that the LED on the front of the controller is flashing. Some functions cannot be remotely controlled, therefore verify the settings in the following table:

The tape deck should be configured as follows:

POWER	ON
PITCH CONT	OFF
MONITOR	AUTO
MPX FILTER	ON
DOLBY NR	DDB
INPUTS L	6
INPUTS R	8
OUTPUTS	5

b) Installation and Adjustment of the Doppler

To ensure proper operation of the Doppler, it is essential to have a properly installed antenna system. RAMs can utilize either a VHF or UHF antenna or both.

Ideally, the antennas should be installed at the top of a suitable tower, making sure it is not in the vicinity of any transmitting antennas(ideally a minimum of 1Km distance) . Structures which can cause reflections should also be avoided. At sites where antenna installations are at some distance from the RAMs unit, it is good practice to properly identify the antenna lead out wires as Doppler/Transceiver etc, to prevent accidentally connecting the wires to the wrong inputs on RAMs.

To adjust the Doppler, select a known channel, preferably with line of sight, and in a known direction. In VHF mode, weather stations are often good sources offering a continuous transmission. Adjust the DF CAL on the front panel, directly beside the Doppler unit, until the readout agrees with the known direction of the radio source.

The readout should not vary more than 5 degrees. If the Doppler appears unstable ie hunting, it is likely that some obstacle is causing a reflection of the signal.

If installing the system in an area where a source is not available, a frequency generator and antenna, or a mobile radio in an automobile could be used, but the 1Km minimum distance should be respected to avoid inducing too much energy into the doppler antenna system.

If adjustment of the potentiometer does not provide suitable calibration, turn the antenna 180 degrees, or verify the antenna connections to the summer box. Redo the calibration.

The system should now be fully functional. It is recommended to verify system operation prior to departing the site.

5 - LOCAL CONTROL OF RAMs

Certain modifications have been incorporated into RAMs to permit control of the unit locally ,without the need of a telephone line. This is normally used to verify system operation during the set up procedure.

Local control is accomplished with the aid of a conventional DTMF phone and a computer(portable) with an RS232 interface.

To permit local control of the **RAMs** unit it is necessary to connect the users phone into the "**Local Tel**" connector on the front panel of the control module. When connected the green led , labelled local telephone should illuminate. Press and hold the "**Ring Simulator**" button for 3 seconds. RAMs should respond with "**HELLO**". At this point follow the same instructions as listed in section 3 of the manual "**Control of RAMs with a Telephone (DTMF)**".

To control RAMs with the local computer,a DB25 female connector is located on the front panel of the control unit. Using a standard PC standard RS232 cable connect the control module to the COM1 or COM2 port of your computer. Start the communication software on the PC, and configure the COM parameters for 2400,N,8,1 or 1200,N,8,1 , depending on the system. The speed of the modem is indicated on the back panel of the control unit.

With the telephone still connected to the front panel, remove the handset from the phone , press and hold the "**Ring Simulator**" button for 3 seconds. After a few seconds have passed, a sign on banner should appear on the computer screen. At this point the telephone handset can be placed back onto the phone. Control of RAMs can now be achieved in accordance with section 2 of the manual.

To locally use the transceiver, the frequencies and tones can only be programmed via the local telephone. Follow the menu procedures for programming the transceiver. Communication over the transceiver can now be achieved through the phone handset, or by installing the microphone/speaker included with the equipment.

At completion of local control, remove the telephone and computer connections, press and hold the ring simulator button for 3 seconds. After approximately 5 seconds a tone should be audible from the modem interface.

A reset button is provided on the front panel t facilitate local control. Never press this button when a scanning session is in progress, **ALL DATA WILL BE LOST**.

Annex A

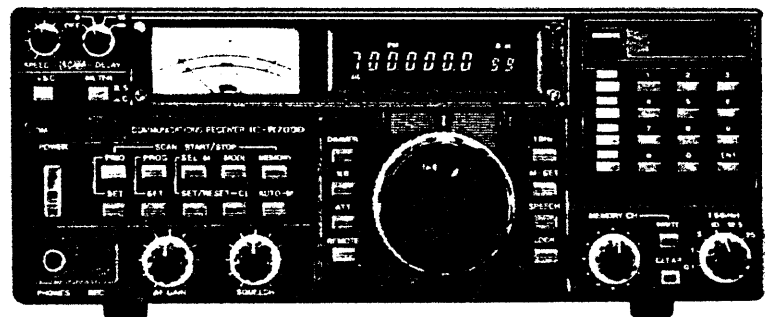
SQUELCH TONE CTCSS LIST

Command	Code	Frequency
01	XZ	67.0 Hz
02	XA	71.9 Hz
03		74.4 Hz
00 05	XB	77.0 Hz
06		79.7 Hz
07	YZ	82.5 Hz
08	YA	85.4 Hz
09	YB	88.5 Hz
10	ZZ	91.5 Hz
11	ZA	94.8 Hz
12	1Z	100.0 Hz
13	1A	103.5 Hz
14	1B	107.2 Hz
15	2Z	110.9 Hz
16	2A	114.9 Hz
17	2B	118.8 Hz
18	3Z	123.0 Hz
19	3A	127.3 Hz
20	3B	131.8 Hz
21	4Z	136.5 Hz
22	4A	141.5 Hz
23	4B	146.2 Hz
24	5Z	151.4 Hz
25	5A	156.7 Hz
26	5B	162.2 Hz
27	6Z	167.9 Hz
28	6A	173.8 Hz
29	6B	179.9 Hz
30	7Z	186.2 Hz
31	7A	192.8 Hz
32		203.5 Hz
33		210.7 Hz
34		218.1 Hz
35		225.7 Hz
36		233.0 Hz
37		241.8 Hz
		250.3 Hz

ICOM

INSTRUCTION MANUAL

COMMUNICATIONS RECEIVER
IC-R7000



Icom Inc.

SECTION 2 SPECIFICATIONS

- Receive frequency range

VERSION	FREQUENCY COVERAGE (MHz)
USA and EUROPE	25 ~ 999.999 *1025 ~ 1999.999
AUSTRALIA and FRANCE	**25 ~ 999.999 *1025 ~ 1999.999

* Specifications guaranteed from 1240 to 1300MHz.

** Excluding 87.5 to 108MHz.

- Receive modes

: A3E (AM), F3E (FM), J3E (SSB)

- Sensitivity

: 25 ~ 999.999MHz

FM : Less than 0.5 μ V for 12dB SINAD

FM (wide) : Less than 1.0 μ V for 12dB SINAD

AM : Less than 1.0 μ V for 10dB S/N

SSB : Less than 0.3 μ V for 10dB S/N

1240 ~ 1300MHz

FM : Less than 0.5 μ V for 12dB SINAD

FM (wide) : Less than 2.0 μ V for 12dB SINAD

AM : Less than 2.0 μ V for 10dB S/N

SSB : Less than 0.3 μ V for 10dB S/N

- Squelch sensitivity

: FM (Threshold) Less than 0.2 μ V for noise squelch

FM (Tight) More than 32mV for meter squelch at S9+60dB

SSB (Threshold) More than 3.0 μ V for meter squelch

- Selectivity

: FM, AM \pm 7.5kHz minimum at -6dB

FM (narrow), AM (narrow) \pm 3.0kHz minimum at -6dB

FM (wide) \pm 75kHz minimum at -6dB

SSB \pm 1.4kHz minimum at -6dB

- Spurious and image response rejection

: More than 60dB

- Frequency stability

: 25 ~ 999.999MHz \pm 5ppm at 0°C ~ +50°C

1240 ~ 1300MHz \pm 10ppm at 0°C ~ +50°C

- Receive system

: 25 ~ 999.999MHz

FM, AM, SSB Triple-conversion superheterodyne

FM (wide) Double-conversion superheterodyne

1240 ~ 1300MHz:

FM, AM, SSB Quadruple-conversion superheterodyne

FM (wide) Triple-conversion superheterodyne

- Intermediate frequencies

: 25 ~ 512MHz:

1st 778.7MHz

2nd 10.7MHz

3rd 455kHz excluding FM (wide) mode

512 ~ 999.999MHz

1st 266.7MHz

2nd 10.7MHz

3rd 455kHz excluding FM (wide) mode

- Frequency control

: CPU based 100Hz step digital PLL synthesizer

- Number of memory channels

: 99 channels

- Supply voltage

: 117, 220 or 234V AC (50/60Hz)

- Current drain

: Receiving 1.7A at maximum audio output

Squelched 1.4A

- Antenna impedance

: 50 ohms

- Audio output

: More than 2.5W at 10% distortion with an 8 ohm load

- Audio output impedance

: 4 ~ 8 ohms

- Usable temperature

: -10°C ~ +60°C

- Dimensions

: 286(303)mm(W) x 110(127)mm(H) x 276(319)mm(D)

Bracketed values include projections.

- Weight

: Approximately 8.0kg (excluding options)

• All stated specifications are subject to change without notice or obligation.

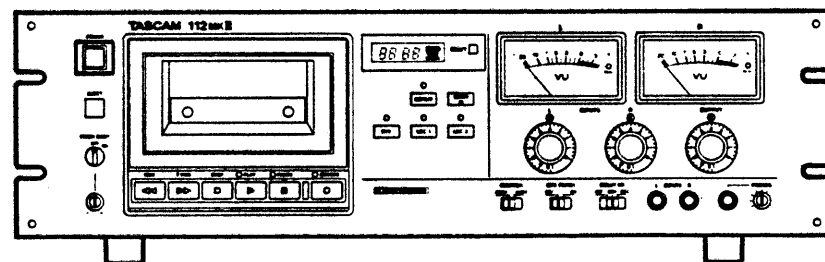
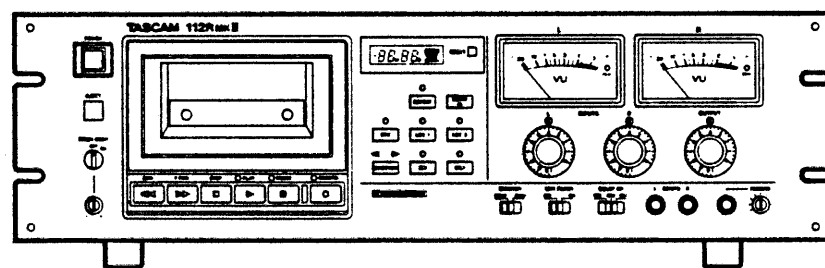
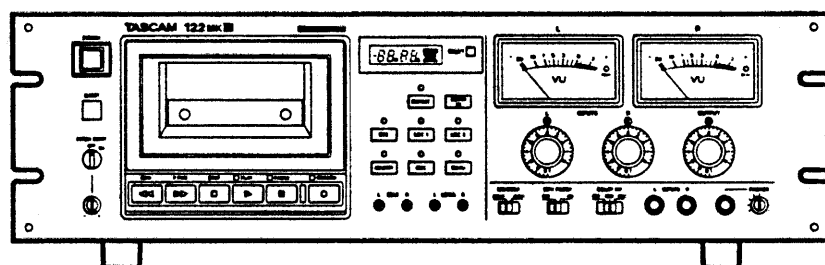
TASCAM

TEAC Professional Division

122MKIII/

112RMKII/112MKII

Magnétocassette stéréo
Stereo-Kassettenrekorder



MANUEL DU PROPRIETAIRE / BEDIENUNGSANLEITUNG

FRANÇAIS

DEUTSCH

5700140600

Fiche technique/Technische Daten

Tape : Compact cassette C-30 to C-90
(Normal/CrO₂/Metal)

Track Format : 4-track, 2-channel

Head Configuration

- 122 MKIII : 4-track, 2-channel
Record (x1)/repro (x1) combination
head (amorphous)
Half track
Erase head (x1) (ferrite)
- 112R MKII : 4-track, 2-channel
Record (x1)/repro (x1) combination
rotary head (permalloy)
Half track
Erase head (x1) (ferrite)
- 112 MKII : 4-track, 2-channel
Record/repro head (x1) (permalloy)
Half track
Erase head (x1) (ferrite)

Motor

- 122 MKIII : FG servo direct-drive capstan motor x1
DC servo reel motor x1
DC ancillary motor x1
- 112R MKII/112 MKII : DC servo capstan motor x1
DC reel motor x1
DC ancillary motor x1

Tape Speed : 4.8 cm/sec. (1-7/8")

Pitch Control : +/-12% (approx.)

Line Input

- Rear RCA jack/front 1/4" jack
- Nominal Input Level : -10 dBV (0.3 V)
Minimum Input Level : -18 dBV (126 mV)
Input Impedance : 20k ohms, unbalanced
- XLR-type jack (standard on 122 MKIII ; optional on 112R MKII/112 MKII—LA-112 required)
- Nominal Input Level : +4 dBm (1.23 V)
Input Impedance : 10k ohms, balanced

Line Output

- RCA jack (rear)
- Nominal Output Level : -10 dBV (0.3 V)
Maximum Output Level : -2 dBV (0.8 V)
Output Impedance : 100 ohms
Load Impedance : 25k ohms or more
- XLR-type jack (standard on 122 MKIII ; optional on 112R MKII/112 MKII—LA-112 required)
- Nominal Output Level : +4 dBm (1.23 V)
Minimum Load Impedance : 600 ohms

Headphone Output : 100 mW (8-ohm load)

Bias/Erase Frequency :

- 122 MKIII/112R MKII: 150 kHz
112 MKII : 100 kHz

Equalization : 3180 μ s + 70 μ s (CrO₂/Metal)
3180 μ s + 120 μ s (Normal)

Reference Recording Level :

250 nWb/m = 0 VU (315 Hz) (EIAJ);
With Dolby : 200 nWb/m = -1 VU

Remote Connector : 25-pin D-sub
(V. aussi p.9/Siehe auch Seite 21)

Power Requirements :

USA/Canada : 120 V AC, 60 Hz
U.K./Australia : 240 V AC, 50 Hz
Europe : 230 V AC, 50 Hz

Consumption :

122 MKIII/112R MKII : 23 W
112 MKII : 20 W

Dimensions (WxHxL) : 482 mm x 132 mm (rubber
feet not included) x 356.3 mm (19" x 5-3/16" x 14")

Weight :

122 MKIII/112 MKII : 8.4 kg (18-8/16 lbs.)
112R MKII : 8.7 kg (19-3/16 lbs.)

Typical Performance

Speed Accuracy :

122 MKIII : +/-0.5%
112R MKII/112 MKII : +/-1.0%

Wow & Flutter¹⁾ :

less than 0.04% WRMS

Fast Winding Time :

70 sec. (approx.) with C-60

Frequency Response, Overall²⁾ (EIAJ, without NR)

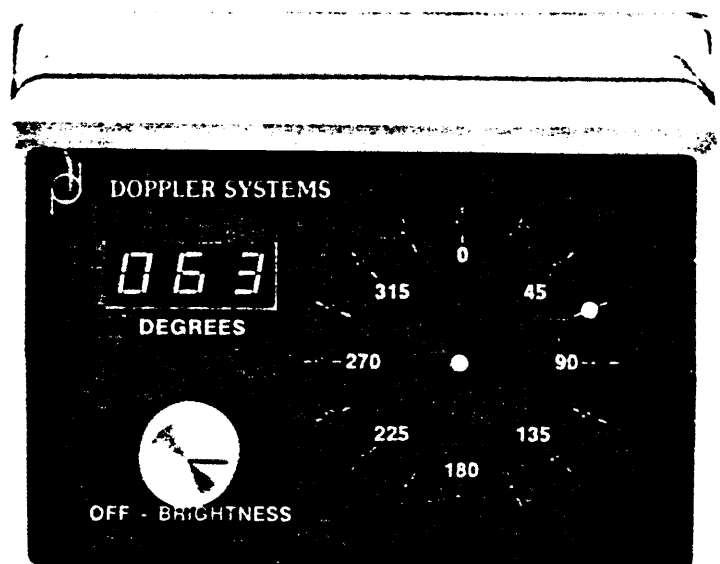
- 122 MKIII : 25 Hz to 20 kHz, +/-3 dB (Metal)
25 Hz to 19 kHz, +/-3 dB (CrO₂)
25 Hz to 17 kHz, +/-3 dB (Normal)
- 112R MKII : 25 Hz to 19 kHz, +/-3 dB (Metal)
25 Hz to 18 kHz, +/-3 dB (CrO₂)
25 Hz to 17 kHz, +/-3 dB (Normal)
- 112 MKII : 25 Hz to 19 kHz, +/-3 dB (Metal)
25 Hz to 18 kHz, +/-3 dB (CrO₂)
25 Hz to 16 kHz, +/-3 dB (Normal)

Distorsion²⁾ : less than 1.0%, at 1 kHz,
160 nWb/m (Metal)

S/N Ratio²⁾ (metal tape)

- 122 MKIII/112R MKII : 60 dB (without NR, ref.3%
THD, WTD)
70 dB (with Dolby-B NR, over 5 kHz)
80 dB (with Dolby-C NR, over 1 kHz)
- 112 MKII : 59 dB (without NR, ref.3% THD,
WTD)
68 dB (with Dolby-B NR, over 5 kHz)
78 dB (with Dolby-C NR, over 1 kHz)

OPERATION AND SERVICE MANUAL FOR 5000 SERIES RADIO DIRECTION FINDING SYSTEMS



DOPPLER SYSTEMS INC.

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Phoenix, Arizona 85046