

# ANODE

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## Editor's Comments

**Volume 7 Issue 11 - July 2007**

### The day after...

The AGM was yesterday afternoon. Yours truly got an award! For which I am very grateful. See the picture below. So did Keith (kneeling), Stuart, Ron and Phillip. For the committee details see the next page. The meeting was followed by a braai with drinks being free from the bar.

The pictures are from Phillip (ZS6PVT). Thanks Phillip.

### Ham-Comp continues

As usual the third Saturday of the month is Ham-Comp day. That's the 21st of July. The meeting will start at 13:00 at the club house.

Those of you who have been trying to find a new hard drive for your veteran PC, can now stop panicking. All new hard disks are SATA, that's Serial ATA. All OLD hard disk drives and interfaces were Parallel ATA types. Your veteran PC can be upgraded to allow the use of the new drives by the addition of a PCI card that allows you to connect a new SATA drive. The cost should be no more than R330 includ-

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**Special points of interest:**

- Contact details on back page (updated)
- Next Ham-Comp is at 13:00 on the 21st April.



## Editor's rants and raves - comments

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ing VAT Rand for the card. I shall be testing this card over the next few days and I will let you know at the Ham-Comp meeting if it does everything they say it can.

If you needed confirmation that sales are down for the last few months see the latest adverts for notebooks and desktops in the local press. Notebooks especially are being sold at ridiculously low prices. One corporation shop is selling an HP notebook with printer/scanner and memory stick for R5999.99 inc VAT. It might be last years notebook, but if you ask any club members about their notebooks, they will tell

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**OM Dave - looking relieved and happy at the AGM.**

## Results of the AGM

At the Annual General Meeting held on Saturday the 7th July, the following elections were held. The Chairman, Vice-Chairman, Secretary, Treasurer were elected according to the constitution of the West Rand Amateur Radio Club.

Chairman	Stuart Baynes	ZS6OUN	082 573 3359	sbaynes@iafrica.com
Vice Chairman	Ron Eva	ZR6RON		ronnie@calidus.co.za
Secretary (Anode)	John Brock	'PieRat'	011 768 1626(H)	brockjk@gmail.com
Treasurer	Craig Woods	ZS6CRW	795 1550 (H)	craig.woods@absamail.co.za
Member	Romeo Nardini	ZS6ARQ		roshelec@global.co.za
Member	Joop Hesp	ZS6C		joophesp@absamail.co.za
Member	Geoff			
Member (Repeater) (Co-opted)	Phillip	ZS6PVT	083 267 3835	
Member				

## Editor's rants and raves - comments

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you that its perfectly adequate for their requirements.

### West Rand Web site

The web site is up and running. It has the latest club news and information. Further improvements are intended and suggestions are welcomed. The address is:-

[http://jbcs.dnsalias.net/ham\\_radio/index.php](http://jbcs.dnsalias.net/ham_radio/index.php)

One addition that I just thought of is the current months birthdays displayed as a table on the club member page. No more hunting around for the old birthday list just before the bulletin!

{—}

From: <netmanager2@yahoo.com>

Subject:

**Packet radio is irrelevant in today's world**

Date: 25 June 2007 21:35

Packet distribution of GB2RS news to end

The Radio Society of Great Britain has announced that GB2RS News will no longer be distributed via Packet. This week's bulletin will be the last.

Amateur Packet Radio has been in decline for the past decade. The loss of the GB2RS news is a further indication that traditional Packet Radio, developed in the 1980s, is increasingly irrelevant in today's world.

Digital Communications Committee website  
<http://www.dcc.rsgb.org/>

The GB2RS news is still distributed via the Internet, see

<http://groups.yahoo.com/group/gb2rsnews/>

Weekly Email copies can be obtained by sending a blank email to GB2RSnews-subscribe at [yahogroups.com](mailto:yahogroups.com)

This story at: [http://www.southgatearc.org/news/june2007/gb2rs\\_packet\\_end.htm](http://www.southgatearc.org/news/june2007/gb2rs_packet_end.htm)

(Southgate ARC World News Service)

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### 70 MHz Band Plan for South Africa

Frequency range	Primary use	Mode Notes
70.000 – 70.030	Beacons	FSK 1 & 5
70.030 – 70.150	2 way simplex communication	CW & SSB 1 & 2
70.150 – 70.200	Digital modes & APRS	FM 1 & 3
70.200 – 70.300	2 way simplex communication	All 1 & 4

The 70 MHz spectrum is under discussion with ICASA with regards our level of access to this band. The only restriction is that of antenna polarisation, must be horizontal to prevent interference with other users outside our borders who still retain 70 to 70,300 MHz for commercial operation. The normal regulations regarding the requirement that an amateur station does not cause unnecessary interference will be enforced. In other words LISTEN FIRST before transmitting.

### Notes:

1. It is available for use but users must ensure that no interference is caused to other users, we at present only have SECONDARY STATUS, i.e. the band is shared with commercial users who have priority and we have to accept interfer-

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## Editor's rants and raves - comments

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ence from primary users.

2. Operation within this part of the band shall only use CW or SSB with horizontal polarisation. The power limit is 400W pep. Amateurs should use increments of 5 kHz to allow the maximum number of users to co-exist.

3. The allocation of APRS service to this portion shall be shared with other digital modes. Channel spacing shall be 12.5 kHz. APRS service providers shall ensure that no undue interference occurs with other amateur users.

4. Within this portion the use of 12.5 kHz channel spacing is mandatory.

5. Beacons shall be limited to an EIRP of 25 W

with an Omni-directional antenna horizontally polarised. Beacons shall be operated in accordance with the IARU Region 1 recommendations with regard to keying speed, shift and identification details. Applications for permanent 70 MHz beacons shall be forwarded to the SARL VHF band planner for consideration. The channel spacing for adjacent beacons shall be 2 kHz.

{—}

**By the way, did you know the SARL has a cell-phone web-site?**

Visit:-

[http://www.sarl.org.za/public/MobiCB\\_HowTo.asp](http://www.sarl.org.za/public/MobiCB_HowTo.asp)

For more details.

## RTTY LOOP - Amateur Radio Teletype

By Marc I. Leavey, M. D., WA3AJR  
6 Jenny Lane  
Baltimore MD 21208

### ICOM Computer Control

At this time of year I am always torn between putting together a column devoted to gift giving-" Everything the RTTY/computer ham always wanted but didn't know how to ask for"-or a column devoted to suggestions on what to do while locked in the shack on these cold winter evenings. Well, some material on the latter topic crossed my desk, and it is so good, I just have to share it with you all.

I found this little gem in the amateur radio database on Delphi, and after discussing the matter with the SYSOP, I'm presenting it here. Carl Clawson N7KBV originated this piece on computer control of ICOM amateur radio gear.

**N7KBV:** Several ICOM products feature a built-in computer interface connected to a 1/8 " phone jack on the rear panel. ICOM gives no

information about this interface in the instruction manuals that I've seen, but my dealer managed to get it from ICOM for me.

This interface, called the "CI-W" is standard on the following models: 735, 761, 275, 375, 475, and R7000. Earlier models (751, 271, 471, 1271, and R71) used the CI-IV parallel interface, which can be connected to CI-V by ICOM's UX-14 converter.

The information I received was written with the 735 in mind, but a listing of a BASIC program to control the R7000 was appended. I believe it will help with the other models, too. The control codes and data format should be the same for all of them.

The computer interface allows you to do such things as: set and read the frequency and modulation mode; set VFO A, VFO B, or memory mode; select memory channel; store displayed frequency into memory; and transfer displayed memory-mode frequency to a VIZO.

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Even without a computer, you can run a cable between the remote control jacks of two rigs, and whenever the frequency or modulation mode of either is changed, the other will track it if possible. (if the rigs have incompatible frequency coverage's, like the 735 and R7000, funny things can happen.)

The bidirectional interface uses TTL levels on a single line for sending and receiving serial ASCII data. You may need an appropriate hardware interface to convert the RS-232 to TTL, for example. (I understand Commodore computers have TTL inputs and outputs, and require no interface.) I used the Motorola MC1488 and MC1489 chips powered by two 9-volt batteries to interface to my RS-232 line. Table 2 lists the pin outs for this interface. If you'd rather buy something, ICOM sells the model CT-17 level converter for the RS-232.

The interface uses a "carrier-sense, multiple-access with collision detection" local area network protocol so that multiple rigs can be connected in parallel without difficulty. Thus, you can use the same RS-232 line and level-converter interface to control many rigs. Each rig must have a unique address, which is set by internal jumpers. Each model comes factory preset to its own address, which is 04 for the 735 and 08 for the R7000. Table 2 has information on the jumper settings.

In the following list, "receive" and "send" refer to data transmission. Thus a "receiver" isn't necessarily an F17000; it's any device receiving data from the CI-V bus. "Rig" means an ICOM product using the CI-V interface. The rigs send and receive data in variable packet lengths, formatted as follows:

### Data Format

#### Byte # Contents

- 1 hex 'FE'(i.e. 11111110 binary, 254 decimal)
- 2 hex 'FE'
- 3 <RX>
- 4 <TX>

5 < Code >

6-n < BCD data of variable length >

n+1 hex 'FD'

The two hexadecimal FE bytes signal the beginning of a packet, and the FD byte signals the end. <Code> is the control code sent by the computer to the rig, which determines the action that the rig will take. In some cases, the receiving rig will include a control code in its response to the sender; see Table 1. <TX> is the address of the device sending the data, and <RX > is the address to which the data is being sent. When a rig responds to a data packet, it addresses that response to the < TX > in the packet. Thus, if your computer requests a rig to report its frequency, it will address that report to the computer and other rigs will ignore the data. (Of course, the computer can lie about its address and trick one rig into talking to another!) Your computer should use its own unique, non-zero address on the network. I will assume in the examples that the computer is at address 02. There are two control codes that can cause any rig on the network to respond when sent with < RX > = 0; I discuss these below.

Bytes #6 through #n contain data required by the control code, in BCD format with 2 decimal digits per byte. Frequency data is sent starting with the byte containing the 1 Hz and 10 Hz digits. These digits are sent even if they are not used by the rig, so that the data format is the same for all rigs regardless of their frequency coverage and resolution. For example, 25.13244 MHz is broken up into two-digit groups: 25, 13, 24, and 40, then coded in BCD. In other words, consider each digit group to be a hexadecimal number instead of decimal. The decimal values of these BCD digit groups are  $2 \times 16 + 5 = 37$ ,  $1 \times 16 + 3 = 19$ ,  $2 \times 16 + 4 = 36$ , and  $4 \times 16 + 0 = 64$ . Now send these groups, starting with the least significant. The complete data packet will be, in hexadecimal: FE FE < RX > <TX> <Code> 40 24 13 25 FD.

If you have more than one rig on the network,

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you may occasionally receive a sequence of 5 bytes of hex 'FC'. This is the "jammer code" used by a rig to indicate that a collision has occurred. Each rig, when sending, monitors the interface. If it does not receive exactly what it sent, a collision occurred, i.e., another rig was sending data at the same time. If a rig detects a collision, it will send the jammer code as soon as the network is idle. A rig that receives this code realizes that a collision has occurred and ignores the previously received packet. Because the ICOM remote control ports are bidirectional, your computer will receive everything it sends, so you can check for collisions from your computer, too.

## Control Codes and Responses

Most of the codes are addressed to a specific rig, which addresses an acknowledgment packet to the < TX > contained in the control packet. The first two codes, 00 and 01, can be sent to the "group call" address, 00, in which case any rig will receive them without sending an acknowledgment. These two codes are sent in this way by any rig when its mode or frequency is changed by manual control, and are received by any rig on the network. This allows a number of rigs to track each other in frequency and mode without computer intervention. Rigs can be inhibited from sending and receiving group call packets by an

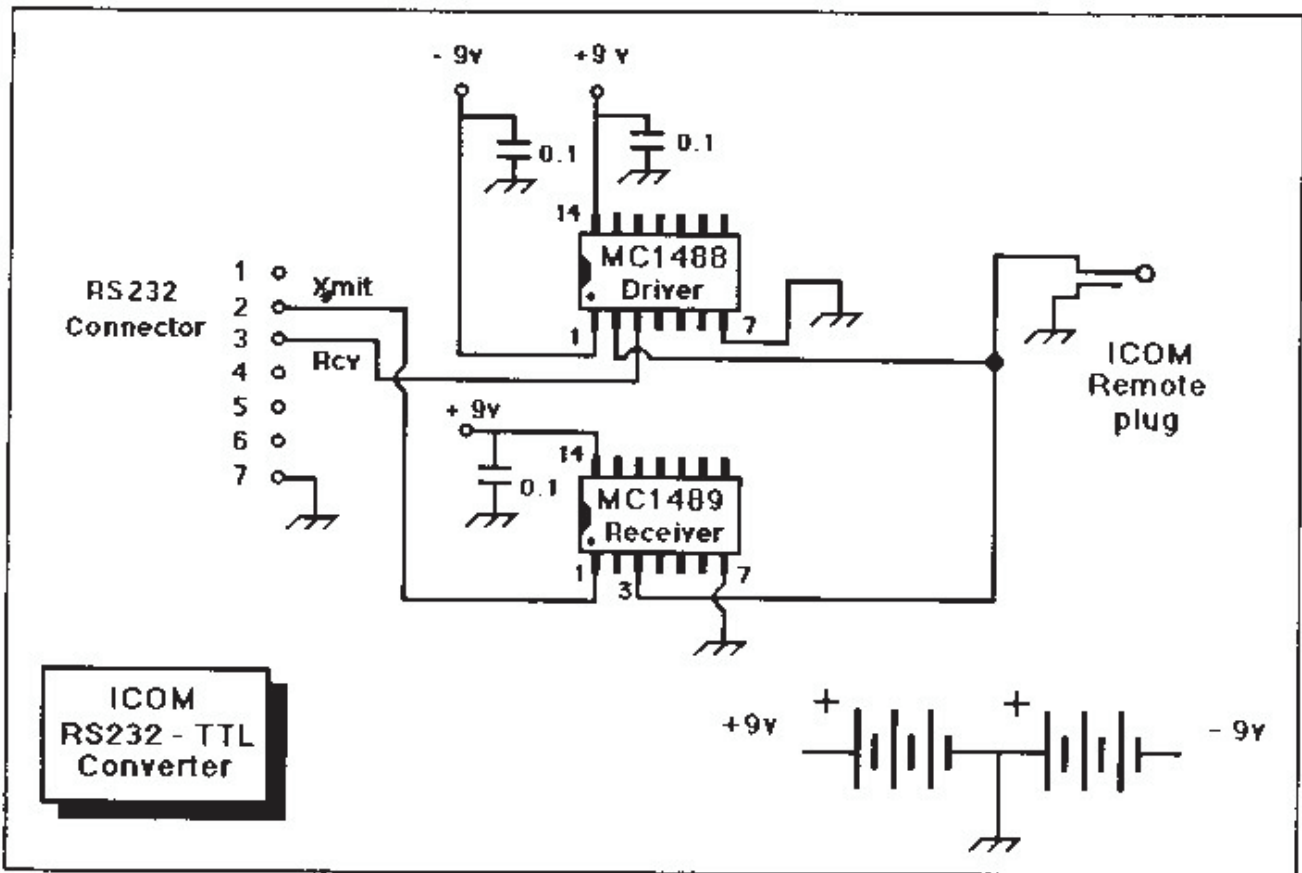


Figure. RS-232 to TTL converter.

internal jumper. See the tables for more details. These codes can also be sent with a specific, non-zero <RX>, in which case they will be

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## RTTY LOOP - Amateur Radio Teletype

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received by the addressed rig even if the group call function is disabled.

Here are some examples for the 735. The 735 is at address 04 and the computer is at 02. First, let's find out what's in memory channel 1 (code 08 to set the channel, and code 03 to read the frequency). Assume the 735 has the frequency 7.12750 MHz stored in memory #1.

Computer to 735: FE FE 04 02 08 01 FD  
 735 to computer: FE FE 02 04 FB FD  
 Computer to 735: FE FE 04 02 03 FD  
 735 to computer: FE FE 02 04 03 00 75 12 07 FD

Now let's change the frequency and mode to 14.02500 MHz USB (codes 05 and 06).

Computer to 735: FE FE 04 02 05 00 50 02 14 FD  
 735 to computer: FE FE 02 04 FB FD  
 Computer to 735: FE FE 04 02 06 01 FD  
 735 to computer: FE FE 02 04 FB FD

Now store the new result in memory #1. This channel is already displayed, so all you need is code 09, the store command.

Computer to 735: FE FE 04 02 09 FD  
 735 to computer: FE FE 02 04 FB FD

### RS-232 to TTL Converter

This is an easily built converter that will run your ICOM gear from a standard RS-232 line. You can build it in an hour or two for about \$10. It uses two inexpensive, widely-available chips the Motorola MC1488 line driver and the MC1489 line receiver (see the figure). The only other things you need are a box, connectors, a power switch, and a couple of 0.01 or 0.1 capacitors to bypass the power supply leads. I used two 9V batteries for power. Power for the 1488 can be  $\pm 9$  to  $\pm 15$  volts, and the 1489 requires +5 to +10 volts. With a suitable DC-DC converter chip, and a 78L05 or 781-08, you could power the circuit off of your 13.8-V supply. Or, if you're

clever, you could figure out a way to trickle charge two 9V NiCds off of your RS-232 line. See Table 2 for pin outs and jumper selections.

There are jumpers in the ICOM rigs to set the device address and baud rate, and to enable the group call feature. You must look on the schematic to find them. The jumper to enable the group call feature is called the "transceive" bit by ICOM, and may be labelled with "7RW" on the schematic. The others are labelled "DBn" on the 735 and R7000; look for something similar. The rigs are factory-set to 1200 baud, transceive enabled.

The table gives specific information from ICOM on the 735 jumpers, and for the R7000 I make a likely guess based on the 735 codes and schematic.

### Last Words

I certainly thank Carl for his fine work, and I hope that this material will enable many of you to more fully use the features in some of the more sophisticated amateur rigs.

Next month, who knows! Maybe I'll have something from you! You see, I really do read my mail, and I appreciate your comments, suggestions, and tips. Pass them along to me by mail, at the above address, or on Delphi (username MARCWA3AJR or CompuServe (ppn 75036,2501). Until next time, my best wishes to you and yours this holiday season, for a Happy Hannukah, Merry Christmas, and a happy, healthy new year.

### Table 2. Pin outs and Jumper Selections

Ground pin 7 of the RS-232 line and the outer conductor of the ICOM remote jack, and you're on line.

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## Jumper Selections

For the 735: The jumpers use lines labelled DBO through DB5 at connector J22 on the PL board. Lines DBO through DB2 set the device address. Line DB3 is the transceive enable. The baud rate is controlled by DB4 and DB5 according to:

DB4	DB5	Baud
0 0		undefined
1 0		9600
0 1		1200
1 1		300

The 735 is set at the factory to address 04.

For the R7000: The jumpers use lines DBO through DB7 at connector J17 on the logic board. The address is set by DBO through DB4; DB5 is the transceive enable, and the baud rate is set by DB6 and DB7. The factory address is 08.

For other rigs: Determine the address by hooking the rig up to your computer and manually changing the frequency or modulation mode. You will receive a group call packet that contains the address of the rig as its 4th byte.

**Table 1. Codes and Responses**

00 Set frequency. See the text for format of frequency data. See code 05 below for more details.

01 Set modulation mode. One or two data bytes are required to indicate the mode desired.

### Data Mode

- 00 LSB
- 01 USB
- 02 AM
- 03 CW
- 04 RTTY
- 05 FM
- 05 00 SSB (R7000)

02 Report tuning range. No data required. The

rig will report its frequency limits in the format:

FE FE < RX > < TX > 02 < upper limit > 21 < lower limit > FD

(Hex 2D is the ASCII hyphen.) According to ICOM, some rigs report the lower limit first.

03 Report frequency. No data required. The addressed rig returns its displayed frequency to the sender in the format:

FE FE < RX > < TX > 03 < Frequency > FD

04 Report modulation mode. No data required. The addressed rig returns its mode to the sender using the codes listed above. Rigs with selectable bandwidth return an additional byte indicating the bandwidth in the format: FE FE < RX > < TX > b4 < Mode > < Bandwidth > FD

### Bandwidth Codes

- 01 Width 1 (widest)
- 02 Width 2 (narrower)
- 03 Width 3 (narrowest)

05 Set frequency. The data format is given above. If the data contains fewer digits than the rig uses, the digits sent will be changed and the rest will remain the same. If the rig receives valid frequency data within its tuning range, it responds with a packet containing the data "FB":

FE FE<RX><TX> FB FD

If it didn't like the data, it responds with "FA":

FE FE <RX> <TX> FA FD

These acknowledgment codes are used by all following commands.

The 735 responds to out-of-range frequency data by sending the "FA" acknowledgement and: 1) If the frequency it receives is less than

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0.1 MHz, it sets its frequency to 0.1 MHz. 2) If it received 4 bytes of frequency data more than 30 MHz, it sets itself to 30 MHz. And 3) if it received more than 4 bytes of frequency data, the data is ignored.

06 Set modulation mode. If one byte is sent, it sets the mode per the above table. If two bytes are sent, the second is the IF bandwidth.

07 Set VFO status. If no data is sent, the rig changes from MEMORY mode to VFO mode. If data 00 or 01 is sent, the rig sets VFO A or VFO B respectively.

08 Set memory channel. If no data is sent, the rig changes from VFO mode to MEMORY mode. If BCD channel data is sent, the rig changes to that memory channel.

09 Store displayed frequency and mode into displayed memory channel. No data required.

0A Write frequency and mode from displayed memory channel to a VFO. No data required.

Taken from; 73 Amateur Radio Today  
December, 1990 Page 57/59

**The West Rand Amateur Radio Club**  
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**Bulletins** (Sundays at ...)  
11h15 Start of call in of stations  
11h30 Main bulletin start

**Frequencies**  
439.000MHz 7.6MHz split  
Input: 431.4MHz (West Rand Repeater)  
145,625 MHz (West Rand Repeater)  
10,135 MHz (HF Relay)

## Radio Amateurs do it with more frequency!

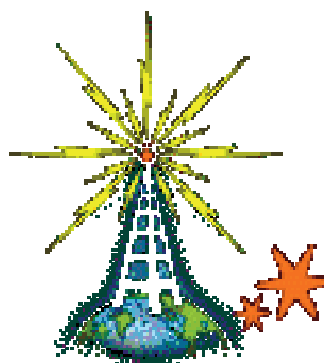
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Member	Geoff			
Member (Repeater)	Phillip	ZS6PVT	083 267 3835	
Member				

## West Rand members - we need your input!

To make this the best ham radio magazine in South Africa we need your input. Please submit articles, comments, suggestions etc.

Please send plain text with no formatting to the email address below.

In July 2003, we re-published an Anode Compendium on CD. It has the issues from July 2000 until June 2005. This included the new Adobe reader. It has been updated, check with the chairman for details.



**We need your input! Email us articles, comments and suggestions please.**  
[brockjk@gmail.com](mailto:brockjk@gmail.com)