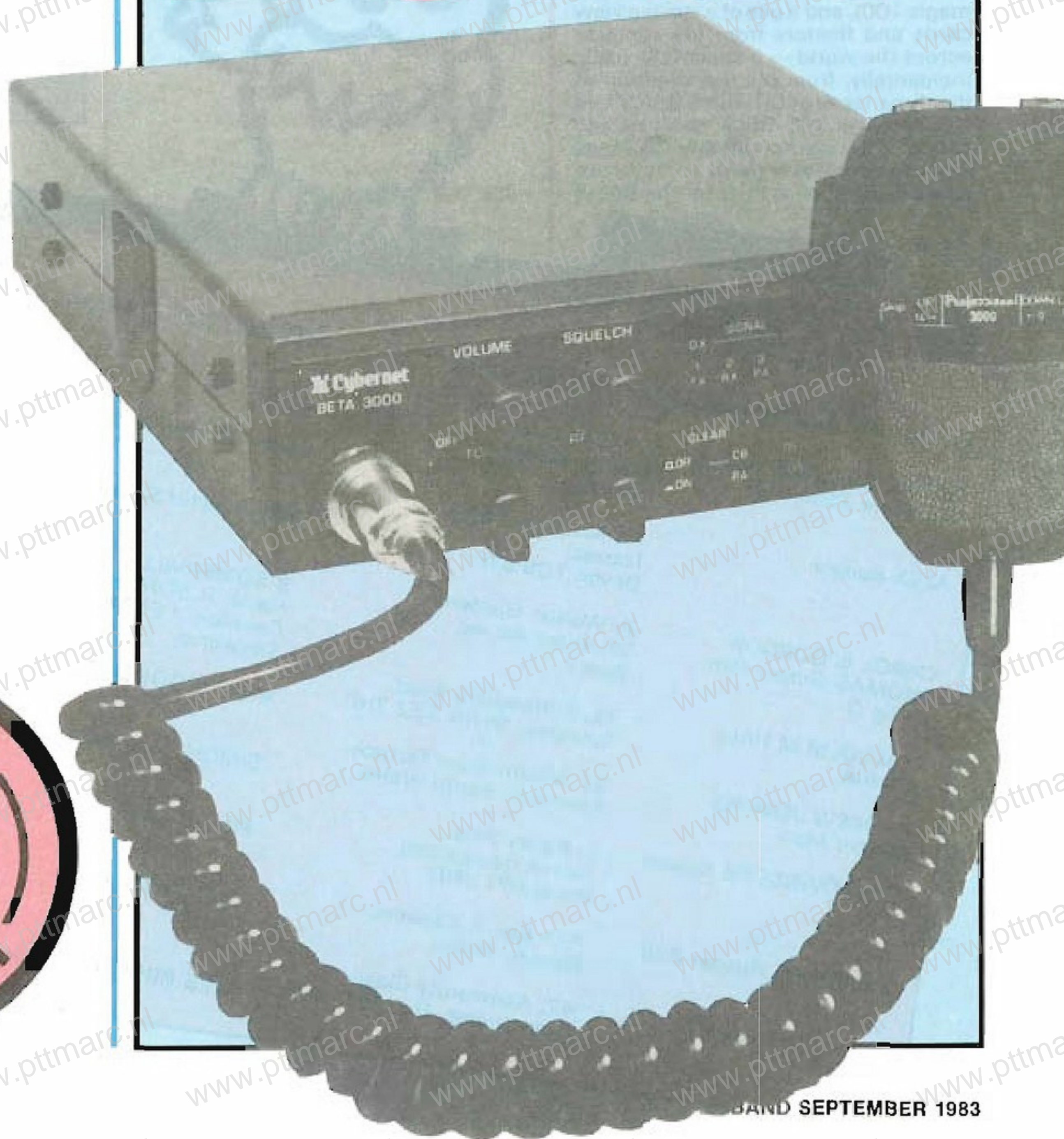# Rig Review

Chris Peterson reviews a very professional rig from Cybernet. But is it all it's cracked up to be? Read on.

Better by Beta?

have to admit right from the start that I am a Cybernet fan. And if the comments heard over the airwaves are anything to judge by, so are a great many other breakers, though they may not realise it! Cybernet are one of the biggest (if not THE biggest!) manufacturers of CBs in the world. Through the magic of badge engineering, they are responsible for some of the best know and respected rigs around. The list includes Yorks, Harriers, Rotels, Binatone 5 Stars, some Harvards and a great many others.

The Cybernet Beta range is a rare instance of a major Japanese manufacturer selling under the name of the parent company. As one might expect, with an extremely high reputation to maintain, the Cybernet rigs are built and perform to a very high standard. For a long time we reckoned these rigs to be the best around. It is only recently with the advent of the 'super' rigs like the Magpies and Mercuries that it has been knocked off the Number One pedestal.

The Professional version of the Cybernet 3000 retains the features of the standard rig, but in addition is now able to offer scanning and SelCall functions. We've covered the Cybernet 134 chassis in detail on numerous previous occasions, so rather than our usual 'blow by blow' account of the workings of the rig, we'll concentrate on the features that make this rig that little big special.

The styling of the Beta range of rigs is rather unconventional and highly attractive. It is remarkably compact compared to its 'badge engineered' cousins. The 3000 will fit into the standard car radio slot, like the console of an SD1 Rover, for example, a feature that endeared it to us from the start! The mike connector, a standard four pin locking ring device, is on the front and next to it is a square group of knobs for Volume/Off, Squelch, RF gain and Tone. To the right of these is a rectangular darkened window containing a green LED bar graph display and some warning LEDs.

The bar graph display operates in one of three modes. In receive it indicates relative signal strength, in the 4 watt TX mode, it indicates power output, and when the 10db attenuator is applied it measures modulation. Beneath the bar graph display is a row of four warning LEDs. From left to right these are TX (red), RX (green), PA (yellow) and Ch9 (yellow). Further to the right again is the channel indicator, a green LED display. Beneath the indicator window is a row of four push buttons. From left to right these are Clear, CB/PA, SelCall (SC), and Ch9. On the extreme right is the channel selector knob.

Moving to the rear, there is a standard SO-259 antenna connector, two 3.5mm jacksockets for external and PA speakers and a two pin polarised power connector. Also at the extreme edge is a small slide switch for the 10db attenuator. Why of why do manufacturers insist on putting this

switch at the rear? If it is going to be fitted at all it ought to be at the front. Black mark, Cybernet!

The microphone looks like the standard Cybernet unit except that it has two extra buttons on the top for remote channel selection and other functions! The rig came with two instruction booklets, one for the standard rig, and one for the special features. The usual mounting hardware and power cables were supplied, and the rig was supplied in a neat and substantial box.

The Beta 3000 uses an isolated chassis, and can thus be used in cars with positive earth chassis. Internal construction follows the usual Japanese methods involving sprinkling components all over the board and pouring in candle wax! Not the neatest way to build a rig, but the soldering is all to a very high standard. The rather untidy internal construction is not helped by the addition of an extra board carrying the scanning and SelCall circuits. To be fair there is no way all those functions can be added tidily unless designed in from the start, but I for one would not like to have to repair one of these rigs!

Special Functions
The new functions that have been added to the rig are quite comprehensive. They are:—
1. Selective Calling facilities (SelCall).
2. Up and down channel change keys on the mike.
3. Ch 14 available immediately from the mike.
4. Ch 9 available immediately from the mike.
5. Automatic scanning for a busy channel.
6. Automatic scanning for a free channel.
7. Skip and lockout facilities for scan busy.
8. Ch 9 monitoring WHILST USING ANOTHER CHANNEL!
9. Roger Bleep.

That's quite an impressive list. Bear in mind that all these functions have been provided with the addition of only two extra push-buttons. As you might have guessed this makes operation quite tricky. Although the operation of each individual function is relatively simple, I suspect that very few people will be able to remember the correct combinations for all the functions!

Starting with the simple ones first, we'll now describe the operation of these functions. The mike has a standard push-to-talk (PTT) switch on the side, but in addition there are two small push buttons on the top. In the simplest mode, pushing the 'up' key (on the left) and immediately releasing it will step the rig up one channel. That is unless you are already on channel 40 in which case it will 'wrap around' to channel 1. Similarly the 'down' key will increment the channels down until channel 1 is reached when it will 'wrap around' to channel 40. Holding either button down will make the rig step continuously in the desired direc-

tion at 4 channels a second until the button is released. At any time the rotary switch on the front of the rig may be turned and the rig will go to the switched channel. (There is an inhbit to prevent the rig changing channel whilst the PTT switch is pressed.)

It is also possible to go directly to channel 14 by pressing the 'up' key, and whilst holding it, pressing either the 'down' key or the PTT switch and then releasing both. Similarly, if the 'down' key is pressed followed by either the up or PTT switches, then channel 9 is immediately selected.

All very ingenious and quite useful. Mobile users might query the choice of channel 14 as a 'standard' channel. It's a pity that the channel 14 combination doesn't force the rig to the channel selected on the rotary switch. This would allow a choice of 14, 19 or any other locally used calling channel, and make use more convenient for the small business users at whome the rig is obviously aimed.

Scanning
This operates in two modes, scan for a busy channel and scan for a free channel. Taking 'scan for free' first, this mode is activated by pressing the 'SC' switch on the front of the rig. The channel display will now read SF (scan-free). When the 'SC' button is released the rig will scan from the current channel until a free one is found.

A free channel is defined as one which fails to open the squelch, so the setting of the squelch control is obviously crucial for correct operation. If the rig is left in the SF mode, scanning will recommence if the channel becomes busy. Pressing the PTT switch will stop the scan once a free channel has been found. Scanning occurs at 10 channels per second!

Channels 9, 14 and 19 are automatically ignored in this mode. A very nice feature of this scanner is that it remembers both the free channel it has just found, and the one from which the search commenced. To go to the starting channel, use the channel 14 combination previously described. To go to the free channel you have just found, use the channel 9 combination previously described.

This gets neatly round the usual problem with scanners, namely getting back to your would-be partner to inform him/her of the vacant channel. Nice one Cybernet, award yourself one bonus mark! The rig will remember these channels, allowing you to flip between them until a single up or down command is given. Then the rig reverts to normal channel 14/9 operation.

Turning next to the 'scan for busy' function, this is a little more complex. First press the SC button, as previously, and the display will read SF. Next press the down key on the mike — the display will now read Sb (scan busy). Releasing the SC button will now cause the rig to search for a busy channel as defined by the squelch setting.

On reaching a busy channel, the scan will stop and the display will flash the channel number and Sb alternately. If the channel becomes free for more than five seconds the scan will continue. Whilst in this mode, the up and down buttons take on yet more special functions. The up button becomes a skip button, and the down button a lockout button. The skip button causes the rig to scan on until it finds another busy channel. If you decide to stay on a busy channel, you have three options:—

1. Turn the squelch down so that the receiver thinks the channel is permanently busy.
2. Press the PTT switch. Transmitting automatically exits the scan mode.
3. Press either the 14 or 9 combinations as described earlier. This exits the scan mode without transmitting.

The lockout button also causes the rig to continue scanning for a busy channel, but tells the rig to ignore the 'locked-out' channel next time round, even if it is busy. There is no limit to the number of channels you can lockout, so it is possible to program the rig to scan around just two or three channels. This might be a bit tedious to set up, but is nonetheless a useful feature. It is especially useful when used in conjunction with the SelCall function.

All locked out channels will be remembered until either the rig is switched off or the PA button is depressed. Unlike the SF mode, channels 9, 14 and 19 are not automatically locked out in this mode. If you wish to ignore them you must lock them out manually as described above.

Channel 9 Monitoring

This is quite unlike a normal channel 9 switch which merely forces the rig to 9 regardless of the position of the channel switch. When the channel 9 switch is operated, the rig will automatically flip between 9 and the selected channel. The only evidence that this is occurring is a slight twinkling of the signal strength LEDs. On detecting a transmission on channel 9, the rig beeps briefly and the channel display reads 9. Although the rig will now lock onto channel 9, the transmitter is inhibited until 9 is selected by one of the methods previously outlined. This is done to prevent accidental transmission on channel 9.

This channel 9 monitoring will operate in all modes including scanning and SelCall. When in the SelCall standby mode, the internal speaker is usually muted. The channel 9 monitor automatically overrides this and allows the emergency message to be heard. When in SelCall mode, the channel 9 monitor is disabled when the send mode is entered.

The channel 9 monitoring facility is extremely well thought-out, and should help to relieve the boredom for the monitoring services. They will now be able to have a chat on other
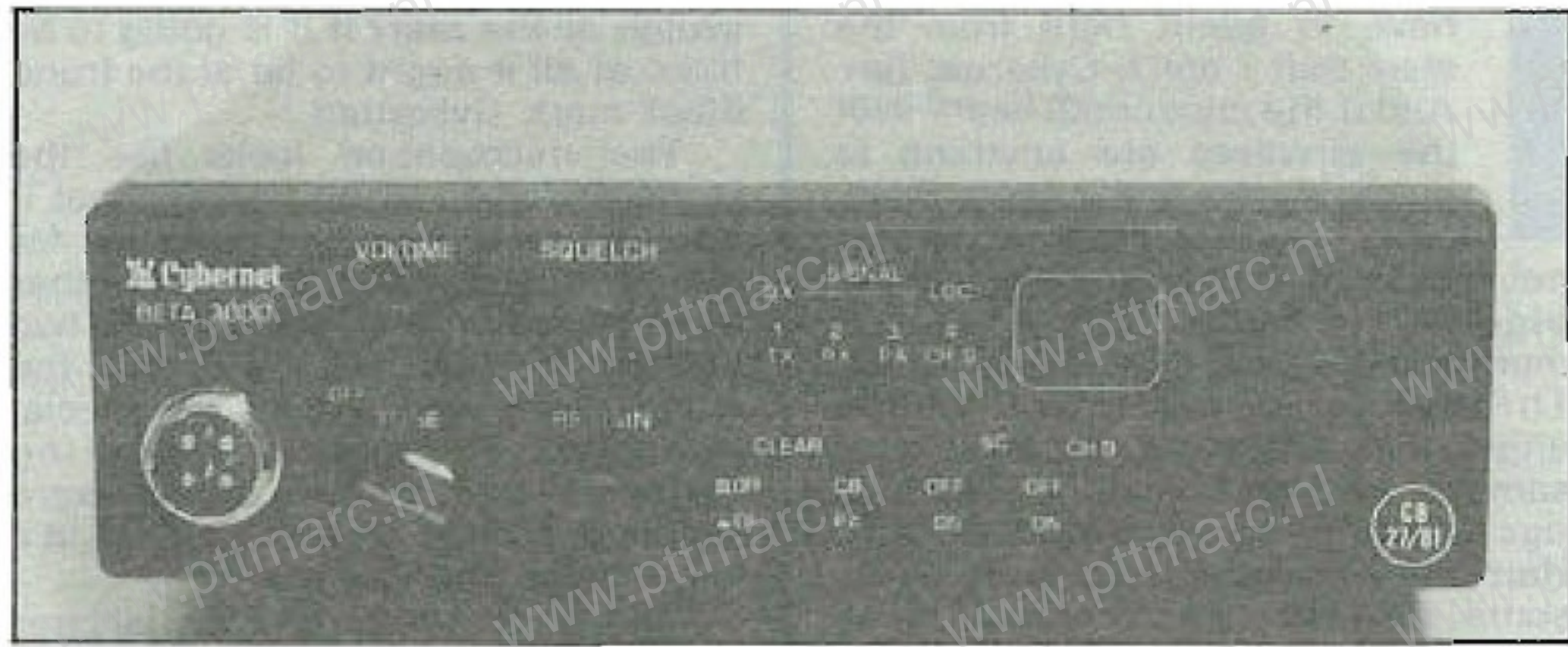
channels without neglecting their monitoring duties!

SelCall

SelCall is a feature that allows the rig to be called without the necessity of constant monitoring. Each Cybernet Professional rig is equipped with a system that allows over 4000 different code numbers per channel. The 4000 different combinations are arranged in groups of 256. The code for each rig is preset at the factory, though instructions are given on how to change the code if you wish. This enables you to select the same or a different code from other operators in your area should you wish.

First of all, if you are going to operate a SelCall service, you have to decide what your calling channel is going to be. Around most urban areas 14 and 19 are pretty busy and you are unlikely to get through on these channels. The instructions mention that channel 3 has been adopted in some areas as a SelCall channel, but we don't know on what evidence this is based. (Any comments from out there?)

Having chosen your channel you can now enter the standby mode by pressing the SC switch and momentarily pushing the PTT switch. The channel display will now alternate between the channel number and SC, and the speaker should be muted.

On receipt of the correct code several things happen.
1. The speaker is reconnected.
2. The speaker will beep at you to attract your attention.
3. The rig will automatically transmit an acknowledging bleep to let the caller know the signal has been received.
4. The display will flash between the channel number and CA. This is in case you are away from the rig when a call comes in.

To answer a call, simply press the PTT switch as usual, and this will automatically exit the SelCall mode. To re-enter the SelCall mode it is necessary to release and re-press the SC switch. To make a call on the SelCall is a bit more complicated. First enter the standy-by mode by pressing the SC switch and dabbing the PTT button. Next select the number you wish to call by using the up and down keys on the mike. These numbers are in Hexadecimal (ask your neighbourhood computer buff!). Briefly this means that in addition to the digits 0 to 9 you have A to F as well. For example 24, 3F, D5 and EE are all valid numbers in Hex. This allows 256 combinations to be selected with only a two digit display.

Having selected the appropriate code, press the PTT switch. The display will now show SE (for send), and the speaker will be reconnected. This allows you to make sure the channel is clear before transmitting. Pressing the UP button will now send the call.

If all is well you should get a responding beep from the receiving rig. If so, simply pressing the PTT switch enables you to transmit normally, disabling the SelCall mode. If no response is heard, the standby mode can be re-entered by pressing the DOWN button. Unlike many SelCall units, the Cybernet one is independent of the volume and squelch settings. It will also respond to a correct code even if you are not in the SelCall mode.

A large number of SelCall units are now available, and most are incompatible with each other. The Cybernet instructions indicate that this unit is compatible with some others, but neglects to identify them. Certainly the length of the call and its sound were not unlike those of some Datong units we looked at a while ago. We would not be surprised if this system were compatible with them.

Having said that, we ought to point out that a single SelCall unit is not much use on its own. Unless Cybernet

are intending to market a compatible unit to fix to existing rigs, they may find themselves out on a limb. They only supplied us with the one rig which made it rather difficult to test the SelCall unit! Ingenuity prevailed however. We set the rig to transmit its own code and recorded the signal on a cassette recorder off another rig. By replaying the cassette into the other rig we were able to trigger the Cybernets SelCall unit. Not very practical, but if nothing else it demonstrated the good noise immunity of the system!

Facts and Figures

We ran the rig through our standard set of lab tests to check compliance with the Home Office Specifications. The rig was well within the specified limits and the following results were obtained:— Supply volts: 13.2 volts. Power out: 4 watts. 10 dB att: 13dB.

These results are good. With all that digital microprocessor circuitry added we had expected the overall sensitivity to be reduced, digital circuits being notorious generators of RF noise! However this rig was even more sensitive than previous samples we've tested, possibly excessively so. Had it not been for the presence of an RF gain control we would have been worried by this extreme sensitivity.

The 10dB attenuator was twice as effective as required by the regulations. They are simple enough to adjust, and I simply cannot understand why so many manufacturers end up with only 0.2 watts output instead of 0.4 in the low power position!

On the Air

The Beta 3000 Professional was used for a few weeks around the West London area and performed to Cybernet's usual high standards. The one feature of these rigs that really shines is the audio quality. The transmitted audio is crystal clear and the received audio lacks that harshness than can be so hard on the ears with FM rigs.

However the Cybernet's weaknesses are there too. The squelch really ought to be better than it is. It certainly has adequate squelch range, but being level operated it is a complete throw-back to AM days. An FM rig ought to have a noise operated squelch. They are simple enough to build and will often prevent the rig opening up on 5 pounds of garbage! The Cybernet squelch has two other shortcomings. It has no hysteresis built in, so that signals around the squelch threshold will cause it to tremble on the brink. This comes over as a noticeable rumbling under certain conditions. Secondly, the squelch is applied after the volume control. Although the 'plop' of the squelch opening is not loud in absolute terms. It can seem very loud when listening at low volume settings in a quiet environment!

Many of the more sophisticated features of the rig rely on the squelch for their correct operation, and this exaggerates the shortcomings of the squelch.

The receiver performance of Cybernet rigs has always been good. Indeed for a long time it was reckoned to be one of the most immune rigs to 'bleed-over' around. However times change, and there are now at least three rigs available offering considerably better immunity in this respect. For the addition of £5 worth of components (a crystal filter for the 10.7 IF stage) the Beta 3000 can be made into one of the best rigs around. It is a pity that Cybernet have not taken the opportunity to fit this sample mod themselves.

Some people may regard this as harsh criticism of a generally fine rig. Indeed the basic Cybernets at around £50 offer very good performance for the money. However the Beta 3000 Professional is advertised at £174.90, and at that price it must be judged by a different set of standards.

My own personal rig is a standard Beta 3000, but fitted with a 10.695 MHz crystal filter and a noise squelch kit (both from Ambit International). The improvement these mods make is staggering, and all for a total outlay of under £10 in one-off quantities. A major manufacturer ought to be able to fit these mods at the factory for less than that. Why haven't they?

Having mentioned the price we are forced to ask "Who is the rig aimed at?". Obviously it is not aimed at the average domestic user. The price seems a lot more reasonable when compared to the cost of PMR (Private Mobile Radio) equipment for the small business user. Also the waiting list for PMR licenses is staggering! I seem to remember hearing the figure of two years quoted not so long ago! So for a small business the Beta 3000 could be a very attractive proposition. The SelCall would make 27 MHz a practical proposition in many areas for this purpose.

Similarly REACT or THAMES monitors may find the facility to monitor channel 9 whilst conversing on other channels a useful facility. It would certainly help relieve the boredom! The basic question remains "is 27 MHz really suitable for such a purpose?". Around our major cities, I suspect the answer must be NO! The 'wally factor' virtually ensures that all the present calling channels are virtually unuseable for many hours of the day. As soon as these idiots discovered the channel being used for SelCall, no doubt they would start playing the Top Twenty all over that as well! A rig with an excellent RF performance might be able to cope with some of this, but while the Cybernet is good, it can no longer be rated excellent!

There is no rig on the market that can be directly compared to the Cybernet i.e. that has both Selcall and scanner. The Magpie 5000 has the scanning facility but no Selcall, and the Mercury 1040 the Selcall but not the scanner. So while both may be better performers as basic rigs, neither can boast these two features.

CB

RIG REVIEW DATA PANEL

Model	Cybernet BETA 3000
Distributor	Goodmans
Typical Price	£174.90

Features	Yes	No
PA Facility	●	
External Speaker Jack	●	
TX Indicator Light	●	
RX Indicator Light	●	
PA Indicator Light	●	
S/RF Meter LEDS	●	
Hi/Lo Power Switch	●	
ANL/NB Switch		●
CH9 Switch	●	
Variable RF Gain	●	
Mike Gain		●
Delta Tune		●
Tone Control	●	
LED Channel Readout	●	

Facilities	Superb	Good	Fair	Poor
Ease Of Controls		●		
Built In Speaker		●		
Microphone Location		●		
Cabinet Construction	●			
Quality Of Control Switches		●		
Channel Indicator Readibility		●		
Mounting Bracket		●		
Hand Book/Instructions		●		

Specifications	
Modes Of Operation	S.M. only
No. Of Channels	40
Weight	—
Dimensions	—
Supply Voltage	13.8V
RF Output Power	4 Watts
Frequency Stability	in spec.
Swamping	good
Sensitivity (RX)	V. good
Spurious Emissions	in spec.

CB VERDICT

Range	XXXX
Clarity of TX	XXXXX
Clarity of RX	XXXX
Ease Of Controls	XXXX
Ease Of Installation	XXXX
Performance	XXXX

We rate our samples on a scale of one to five. Five stars is the highest rating, three and four stars are good to average and one and two stars mean it's not doing so well.