

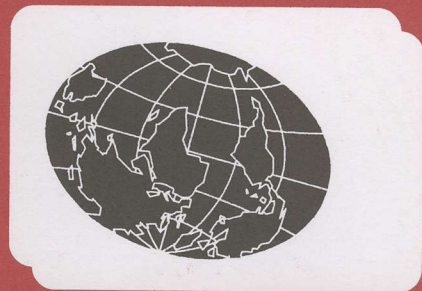
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Bob Cooper's

AUGUST 15 2002

SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific and Asia

IN THIS ISSUE

**Polarisation losses
and rain fades**

**Nokia BDM,
Faster Zapping,
Rolf Deubel**

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ISSN 1174-0779

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This publication is dedicated to the premise that as we are entering the 21st century, ancient 20th century notions concerning borders and boundaries no long define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education.

These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

Editor/Publisher

Robert B. Cooper (ZL4AAA)

Office Manager

Gay V. Cooper (ZL1GG)

Reaching SatFACTS

Tel: 64-9-406-0651

Fax: 64-9-406-1083

Mail: PO Box 330

Mangonui, Far North

New Zealand

Email - Skyking@clear.net.nz

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COOP'S COMMENT

Last November there was a management change at Comet that coincided with hierarchy shuffling already underway at Foxtel. One of the issues of concern involved "stock control" or more precisely, the UEC decoders. At the end of each calendar month, Foxtel (as well as Austar) installers, whether they work for Comet or UCC/Access TV or whomever, are required to perform a physical stock take to verify the status and location of all Foxtel (and Comet) owned parts. In November, Foxtel had advised Comet (and Comet advised installers) that no new inventory UEC decoders were planned. This made it mandatory that decoders that seemed defective or were known to be broken somehow get back to Foxtel and then UEC for repairs.

In January and February of this year, stock takes pretty much balanced and records checked. However, by the end of May nearly 1,000 Foxtel IRDs had come up missing through Comet and another even larger number through UCC/Access TV. In June Foxtel hired an ex-NSW police investigator to head up a new department which has but one purpose - crack down on missing hardware and identify where it is going.

In NSW there are in Telstra listings 774 businesses offering "antenna, aerial" and as often as not "satellite" installation. In Newcastle's telephone region, alone, 99. Many of these 774 businesses have recently been receiving telephone calls from someone who is pretending to be interested in a "satellite system" - a satellite system "without the bother of subscription." This new Foxtel initiative is a form of entrapment - designed to catch out people who are peddling MOSC (modified original smart card) run DTH systems built around the wide spread availability of Goldwafer cards. The same initiative is attending Sunday Market Swap Meets (where cards and systems have recently been on offer), stopping in at neighbourhood pubs and asking the barkeep, "Who would I talk to about a satellite pay system for my home?" Advertisers appearing in local shopping guides offering any format of satellite work or system are being contacted.

Meanwhile back at Comet and UCC/Access TV, new pressures have been applied to the installation management firms. One threat - still being considered - is that if Foxtel catches anyone working for a contract installation firm as an installer who is dealing in grey market systems or cards, the contract firm will lose all Foxtel business in that state. To drive that message home, a (NSW) 'Mr Antenna' franchisee was recently caught out minus 28 Foxtel decoders that records indicated he had. First he will pay for them (typically A\$520 each) and next he will never work for Foxtel again.

Foxtel is working through introduction of a newly designed Installer Manual to attempt enforcement of work (install) standards as well. Last year Foxtel wanted to catch the attention of installers and told Comet that fines were to be levied when field inspections revealed non-conformities on a job. Installers protested and the fines were temporarily suspended while legal questions raised by installers were sifted. An installer might gross \$75 on an installation. He has understandable animosity towards contractors such as Comet who are paid \$220 for the same job but as the contractor-management firm also must supply the hardware (less only the set-top box), most accept that the payment routine is difficult primarily because of Foxtel rules, not Comet policies.

Health and Safety rules, mandating how high you can go, when you use a safety belt, where the ladder must be secured (to barely scratch those rules) make the installer's life even more complex. If an installer follows all of the rules (health/safety/Comet/Foxtel) he might - *might* - manage 2 installations a day. If he shortcuts some rules, and is very good at what he does, double that. Few manage 4 a day and for those that do, after-installation field inspections by Foxtel or Comet folks are a constant worry. Foxtel's view of installers is akin to a fisherman's association with bait. Use it, when it gets tattered, throw it away. Comet, to their credit, is at least trying to mend broken parts.



August 15, 2002

In Volume 8 ♦ Number 96

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MediaStar's D10 Irdeto-embedded receiver -p. 10

Nokia: Faster Channel Zapping, Build a BDM, Rolf Deubel answers questions -p. 14

AFRTS Pacific: C-band AFN Gone - how it works -p. 21

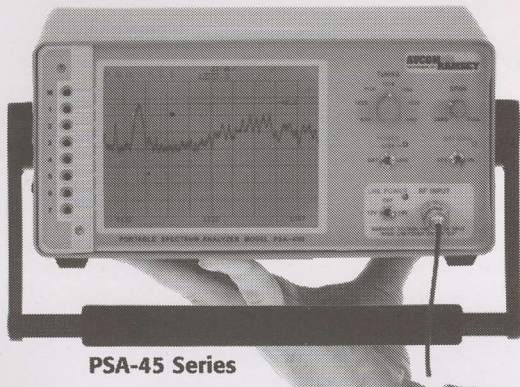
Departments

Programmer/Programming Update -p.2; Hardware/Equipment Update -p. 4; SatFACTS Digital Watch -p. 23; Supplemental Digital Data -p. 26; With The Observers -p. 28; Viaccess cancels Humax; 3,000 stolen d-Box 2s - p. 26; At Sign-Off: (Rain fade and customer good will) -p. 31

-ON THE COVER-

There is something wrong with this installation of a Sky Network (NZ) dish system. Can you spot the mistake and work out why it increases rain fade? Page 6.

What's New at AVCOM RAMSEY? The LCD Lightweights!



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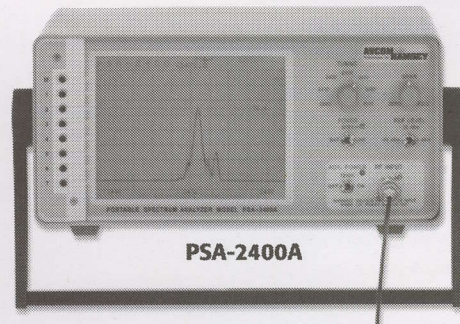
PSA-45A \$2,060.00

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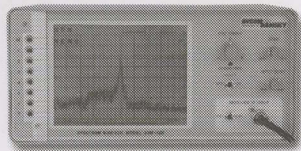
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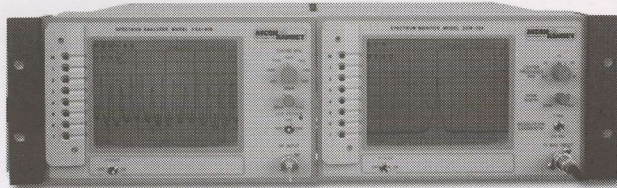
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PSA-2400A



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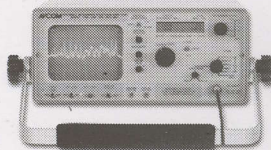
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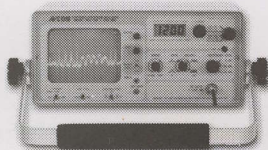
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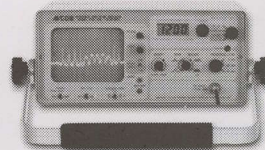
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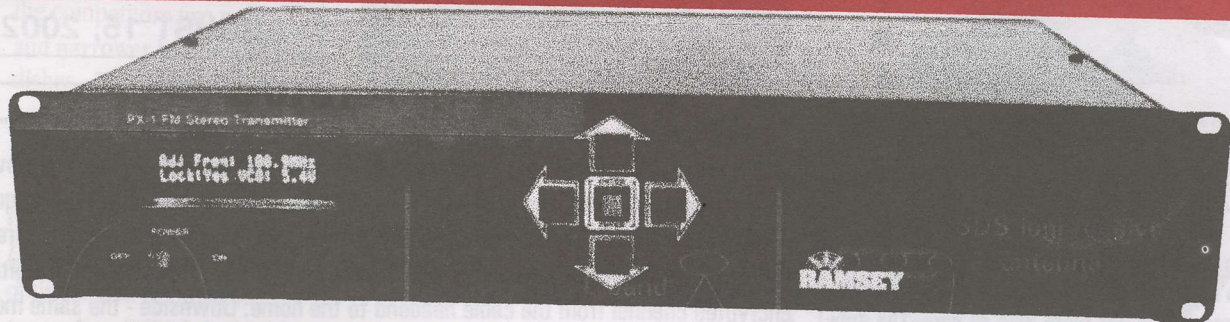
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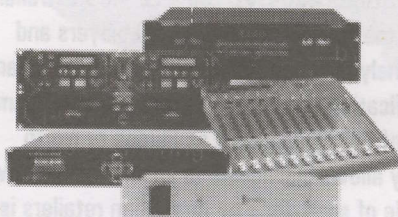
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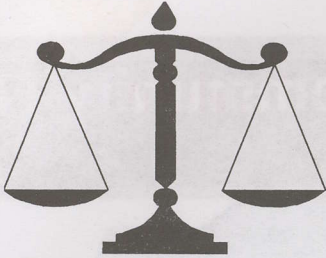
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The answer is yes

"The July issue was excellent! Is Rolf Deubel going to be a regular contributor to SatFACTS - I hope so!!!"

GW, Tahiti

The answer is no

"I do not care how a Nokia works but appreciate there are people out there who do care. The July issue was a not-so subtle slide into a grey area which does not please me. I also noticed the magazine's subscription card now lists the price in Euros - the new universal European currency. Does all of this suggest something about SatFACTS refocusing its attention away from our part of the world?"

IF, Queensland

As long as the banner on the front cover reads "Reporting on the world of satellite television in the Pacific and Asia" you can rest assured there is no secret plan at work to slide the magazine's focus off to Europe - or anyplace else.

Caveat Emptor

"Some biped calling himself Azhar Abbas has nicked me for A\$1,000 by offering a 'decoder that does everything' - it does not. It is my fault for being so trusting."

XX, WA

At \$50 a month for Foxtel, \$1,000 is the equivalent of 20 months. We fail to see where the 'bargain' even appeared-to-be, here.

Linux Rules

"I barely understand my PC but appreciate it must have an Operating System (OS) and Windows from Microsoft appears to do that. What is Linux and how is it different?"

AI, NSW

Microsoft has claimed 95% of the software/middleware Operating System marketplace. Imagine how your world might be if Rupert Murdoch controlled 95% of all of the TV sets in the world. Linux is a "share ware" (or, freely available to anyone) alternative OS which means a \$1,000 (your cost) PC does not include \$250 going to Microsoft if it comes with Linux (thereby reducing the cost of the PC to \$750). Linux enters our world primarily through the German-bred d-Box 2 because the folks designing the "alternate" software for same have stayed totally away from any Microsoft in preference to using Linux share ware.

DVD/Playstation rules relaxed

"An Australian federal court has ruled it is not illegal to commercially modify DVD players or Playstations so they can use discs sourced from outside the country. What does this mean for pay-TV cards sourced elsewhere?"

David L, NSW

Only that modifying receivers would no longer appear to be a grey area. Cards, on the other hand, are probably not affected by the ruling.

PROGRAMMER
PROGRAMMING
PROMOTION

UPDATE

AUGUST 15, 2002

VOD - video on demand. It works this way. Cable operators create "servers" which are high capacity hard drives capable of recording dozens of separate movies. Viewers contact (telephone or through two-way cable using their remote) to request a specific movie at a specific time, for a fee - like going to the corner video store *without leaving your couch*. The server "streams" the requested video on a digital encrypted channel from the cable headend to the home. Downside - the same movie goes out to every cable home simultaneously but the encryption keeps it secure from all except the ordering home. Unless there are "cable pirates" on line who have worked out how to decrypt the VOD streams from their own couches. Each "stream" is a revenue producer - connecting one specific movie at a specific time to one designated home's decryption capable set-top box. In 1994, a server-stream cost US\$10,000 which meant the cable operator had to generate many times \$10,000 per stream in revenue to pay for the server + the movie itself which he leases from a distribution company. Streaming technology has developed rapidly - 1,000 "streams" per server was maximum in in 2000, today supplier nCube has up to 6,500 streams per server at a cost of US\$600 per stream, greatly reducing the revenue that must be generated per stream to pay for the fancy system. Next generation servers will offer up to 30,000 "streams" per server. Stream? If house "A" chooses "*Gone With the Wind*" at 8.01PM and house "B" selects "*Men in Black-II*" at 8.01PM, that's two streams in use. Further downside - servers get bigger, offering more concurrent streams, but the cost per stream only comes down when the cable operator has a huge audience buying lots of movies. Could you do this by satellite? Nope - each stream is a standard digital-compressed "channel" which means standard limitations apply - perhaps 12 to 16 "streams" per transponder, no different than today's Foxtel/Austar/Sky NZ "streams."

ACCC approves "modified" Playstations and DVD players. An Australian Federal Court apparently has approved the "modification" of DVD players and Playstations which allow them to routinely play non-Australian market DVDs and Playstation games. The \$30-\$45 modification "corrects" players allowing them to use discs intended for other "regions" of the world - such as Europe or North America which Australian law currently allows individuals to import for their own private use (however, commercial resale of such discs by Australian retailers is still a grey area and some have been punished for "wholesale importation" of discs for resale purposes). ACCC's controversial head, Professor Alan Fels, told press, "*This court decision is the first one in the world which has gone the consumer's way.*" Fels believes the decision will drive down Playstation game and DVD movie pricing in Australia to the benefit of consumers. Downside? The same player-mod also allows people to play "pirated" discs as well.

Irdeto Access Asia Pacific has changed locations; now at Suite 2, Level 16, 275 Alfred St, North Sydney 2060 tel 61-2-9957 3388 and fax 61-2 9957 5188 (those contact numbers have not changed). Queries to Ali Bakx, Asia Pacific Administration Manager.

Retired from U.S. military, State Department? If you know somebody who is, they qualify for AFRTS/DTS TV and radio service. Details on p. 20.

Austar funds nearly gone. Austar's (remaining) cash-on-hand fund dropped from A\$43 million at end of first quarter to under A\$15 million on June 30th suggesting ... well, what is left may not last much longer (Galaxy II?).

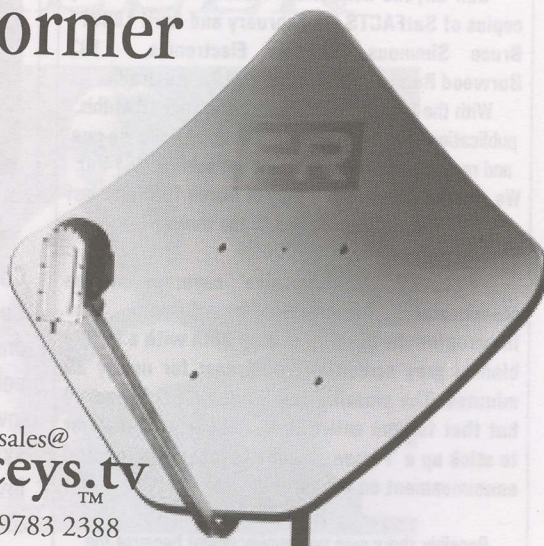
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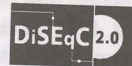


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1998 SatFACTS?

"Can anyone help with locating for our library copies of SatFACTS for February and April 1998?" Bruce Simmons, Skandia Electronics, 183 Burwood Road, Hawthorn, Vic 3122, Australia

With the September issue we begin year 10 of this publication. Complete sets from the first issue are rare and recently on eBay a 90 issue set sold for US\$450. We provided Bruce with a copy of March 1998, the last "spare" one we had on the shelves.

Black screen

"Channel 7's 'exclusive' coverage of the Manchester Commonwealth Games was interrupted the evening of July 26th with a totally blank / grey screen being telecast for nearly 30 minutes. The amazing part - not that it happened but that for the entire time, nobody at 7 thought to stick up a 'Please standby - technical difficulty' announcement on the screen!"

NS, NSW

Possibly there was no announcement because the fault occurred after a point where an announcement could be inserted in lieu of the programming.

Another Optus B3 FTA

"Globecast (ex-Mediasat Sydney) has added TBN (Trinity Broadcasting Network) to their 12.336 B3 bouquet. The immediate affect of this will be TBN beomes first-time available to small home dishes (60-90cm) throughout Australia and New Zealand; dishes small enough they can be installed without a building permit or Resource Management hassles. Before the end of August, the programme server used to feed this service is scheduled to be reformatted such that programming arrives in Auckland or Sydney more in line with the local time of day (presently the feed is scheduled around USA time zones which means what we see at 8PM Auckland or 6PM Sydney is actually slanted at 1AM USA west coast or 4AM USA east coast). That will straighten out the appearance of children's shows in local prime time and prime time well after most folks have gone to bed out here."

Owen Sunnex, Trinity Broadcasting Network
sunnex@paradise.net.nz

This all-English "family channel" programming should in fact result in a modest burst in new system sales activity in both countries. TBN was originally known as the "home of itinerant preachers" and the "message" was basically, "send me money." In the last year it has changed the schedule significantly and while overt religion is not gone, the content has mellowed to the point that approximately half their schedule is just plain "TV" and pretty good TV at that. The Globe/Mediasat service is as noted on 12.336Vt, Sr 30.000, FEC 2/3, MCPC channel 6 with Video PID 1660, Audio 1620, PMT 5006 and ECM 6006 (yes, SA PowerVu numbers). A FTA MPEG-2 based 90cm dish install for this ought to fetch around A\$1,500 including labour. Senior citizen care centres, religious-based schools, Baptist and other Protestant churches, commercial businesses with strong-faith owners and individuals looking for an escape from modern commercial television are all "sales targets." We carry TBN on our cable system and find it is popular with folks over 60 in particular.

HARDWARE EQUIPMENT PARTS

UPDATE

AUGUST 15, 2002

Missing decoders? Insiders buzzing about rumoured A\$400,000 "bill" sent to Comet Satellite & Cable by Foxtel for sizeable quantity of "missing" set-top units Comet cannot account for (Comet in turn is demanding installers produce missing units or pay for them). Foxtel's new piracy investigator Mark Mulready, ex-NSW police, is looking for leads (03-9200 1130) to locate cracks in Comet's control of inventory which Foxtel believes is going into grey/black market at up to A\$2,000 per system complete with scammed "Gold Card." It may not only be Comet personnel involved - UCC/Access TV also reportedly has been asked to explain more than A\$1m in "unaccounted-for" inventory. Foxtel is "serious" about closing these cracks!

Missing #2. German police have nabbed a Spanish citizen operating out of Hamburg and an Italian in Munich charging them with theft of thousands of (programmer Premiere owned) d-Box 2 IRDs. The d-Box 2 is especially attractive because it can be modified to use "Open Source" operating system LINUX which in turn allows software to operate the IRD without a smart card to function. e-Bay auctions have been offering d-Box 2s for around 300-350 Euro recently.

Ultimate installer meter? Peter Lacey is justifiably proud of his brand new available DaTum 10 which allows you to hold in your hand an instrument to quantify digital satellite, digital terrestrial and "old fashioned" analogue as well. This is a nifty item someone has designed very well - one feature that jumps out is the ability to monitor up to seven (7) terrestrial TV channels simultaneously (see them all) so that as you probe for the best terrestrial signal levels, you can see when *all* of the channels are up, not merely the one you happened to be tuned to with a conventional instrument. Details from (61-3) 9783 2388 or Email to peterl@laceys.tv.

Hand picked parts. SatFACTS #95 touched a sensitive nerve - hundreds of letters and Emails from folks who want to know more about turning their Nokia 92/95 and d-Box1 series IRD into more versatile machines. Now that we have Rolf Deubel creating Nokia-mod information on a regular basis (see p. 15), one of the first challenges is locating the parts required to make changes. Deubel went into the marketplace and located 100-lot pricing on RAMs, sockets and a variety of parts which will be essential for future-scheduled projects (yes - including the 5410Z). But processing orders from RSA is a pain in the butt (even shipping stuff there is a complicated procedure). So for the time being, The SatFACTS Parts Store will be supplying otherwise difficult to locate parts direct from New Zealand. Anyone who is in the "real" parts business wishing to take over this "extra workload" (which we certainly don't need here) should contact us directly about the process. For now, see p. 30 advertisement.

MusicCountry. It won't do any good of course but MusicCountry-USA is asking viewers to protest Austar (and Optus cable) plans to drop their USA based channel 1 September. Plea faxed to viewers notes, "*Your operator has announced their intention to stop broadcasting MusicCountry on September 1 and replace it with the all American Sports Channel ESPN.*" Strangely, ESPN is already well established fixture on Austar (channel 24). MusicCountry is actually now STC or the Soundtrack Channel which gradually eroded MusicCountry "content" from mid-March in favour of somebody's concept of a sure-fire "winner" - extracts from movie musicals rolled into a full-time TV channel. Plea for support is headlined, "A Demonstration of People Power is Needed Now!!!" In fact, it would appear the people have already spoken. And the future of STC through PAS-8? Losing Australia, not good. Another useless 9223 which SA won't help you reconfigure for another service.

THE GIANT KILLER

SRT 2620

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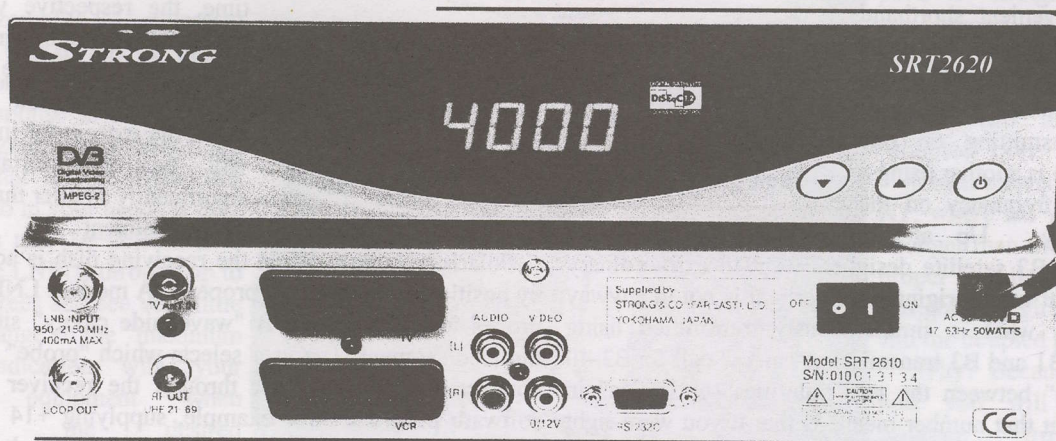
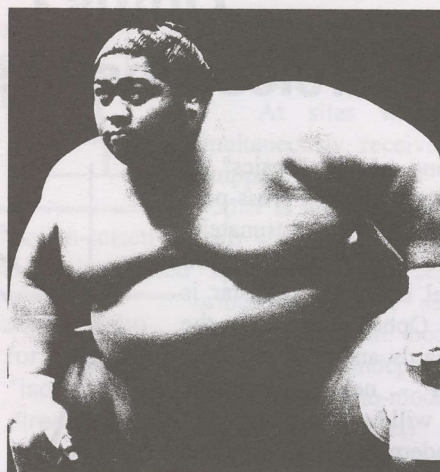
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Optus C1 and Cross Pole: Careless installs that will eat your lunch

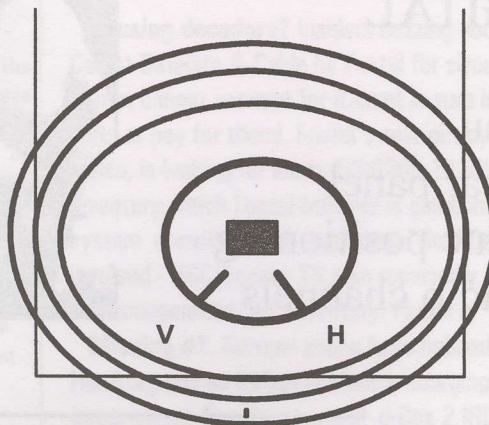
It is one of the "basics" of satellite installation; cross-pole isolation. And unfortunately, installers are often doing a bad job of it. Foxtel is worried, Austar is concerned, Optus is back to the drawing boards and it is effecting when - if - new replacement satellite C1 will be launched.

All modern satellites use and then reuse the satellite downlink (space to earth) frequency spectrum. We label this "frequency reuse" in a convenient shorthand calling one set of signals "vertical" and the other "horizontal" when what we really mean is for every transponder transmitting on one polarisation there is another using a nearly identical frequency on the opposite polarity. Up at the satellite, B1 and B3 satellite designers went to extraordinary care to ensure that when originates in vertical is not in anyway contaminated by what is simultaneously transmitted using horizontal. The B1 and B3 transmission "specs" call for 33-40 dB of "isolation" between the two polarities (or "poles" in shorthand). What that number means is that if you were right at the satellite in space and measured the output signal's level or strength using one polarisation, the opposite polarity at that location would be -33/40 dB in strength.

For many years, during the "analogue period," satellite system designers believed that opposite poles should have a minimum of 24 dB "isolation" between one another. This was based upon laboratory measurements where two unrelated signals were connected simultaneously to a receiver and engineers closely inspected the reception on a monitor searching for visual signs of image degradation under a wide variety of "modulation" conditions. In the worst case, they found, if the desired signal was 24 dB stronger than the undesired signal simultaneously received on the test receiver, there was no perception of interference between the two. Thus if one was installing a receiving system on earth and a vertical signal was 24 dB stronger at the receiver than the opposite pole horizontal signal, all would be well.

At the receiver

No matter how carefully the satellite maintains a specified "isolation" between the vertical and horizontal transmissions, the guy on the ground making an installation can screw up the isolation by being careless with the adjustment of his antenna feed system. And this is the weakness



LOOK down into a dual-polarity Ku LNB's waveguide throat and this is what you will see - two tiny "probes" each voltage selectable (+14, +18) at the receiver.

that now concerns the programmers because when Optus C1 replaces B3 at some still undetermined future date, for the first time in Australia there will be the potential for installer error to *really* degrade customer reception. Why? Because for the first time Foxtel and Austar homes will be switching between vertical and horizontal polarised signals when they change services with their remote control. And for the first time, the respective vertical and horizontal transponders will lay almost on top of one another in frequency use (and reuse). In short, the *margin* for installer error will be uncomfortably small; significantly smaller than it is now.

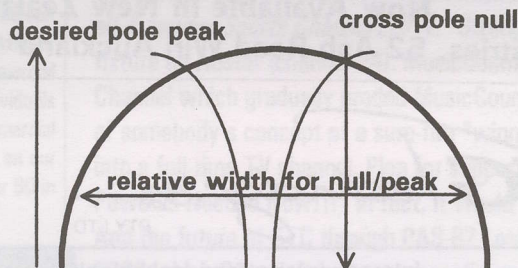
The adjustment

Polarisation selection at the receiving dish is accomplished by positioning the LNB(f) properly. A modern LNB(f) has two probes inside of the LNB "waveguide cavity" sitting behind the feed segment. The user selects which "probe" (antenna) is connected to the receiver through the receiver / decoder's software program. For example, supplying +14 volts to the LNB selects one (call it vertical) while +18 volts selects the second probe (call it horizontal). But this selection process makes an assumption which only works if the installer has adjusted the LNB(f) properly - that the vertical probe is "aligned" to respond to the vertically polarised incoming signal and vice versa. The probe in the LNB is a miniature Ku (or C) band "antenna." The physical alignment of the probe antenna must correspond to the incoming wave polarisation.

Using a signal level meter or spectrum analyser or BER meter for an install tells you when there is maximum signal or signal quality (BER). Seemingly, if you adjusted (rotate) the LNB(f) while watching such a device for indication of best signal, that would simultaneously also be "best cross pole isolation."

How does that work? As the LNB(f) is rotated in its mounting collar in a circle, each time the connected probe passes through alignment with the incoming signal, the signal will "peak" in level / quality. If you are connected to the designated horizontal probe and you peak the LNB(f) for maximum horizontal signal from the horizontal probe, in theory the vertical signal will at that point be minimised. Why?

Because inside of the LNB's front end cavity there are two probes, each 90 degrees in physical



alignment from the other. When the maximum signal is found on horizontal, switching to the opposite probe should find maximum signal on vertical as well - one adjustment suits both polarities.

That's theory. In practice, life is a tad different and this is where installers who have been less than careful in making their polarity

rotation adjustments are heading for perhaps massive

call-backs when C1 comes on line. Here's the problem. The probe antenna has two very different "responses" to a polarised input. The first response is how it reacts to a signal polarised the same way as the probe itself. The second response is to signals arriving in the opposite polarity. A probe that is horizontal with respect to the horizontally polarised incoming signal has a broad, "fat" response whereas the same probe's response to the opposite polarity signal is very "thin." We diagram that above. What this translates to in your hands is this:

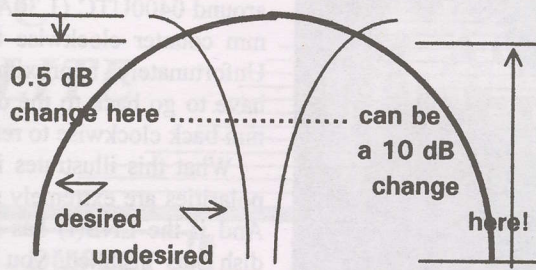
1) You may be able to shift (rotate) the LNB(f) through up to +/- 10 degrees and see very little (or no) change in the "maximum signal" indication with your metering equipment when measuring the desired polarisation.

2) But if you were simultaneously monitoring the change in signal level for the non-desired (opposite) polarity, the signal level in the +/- 10 degree rotation could easily change by 10 to 15 dB. And that's a bunch.

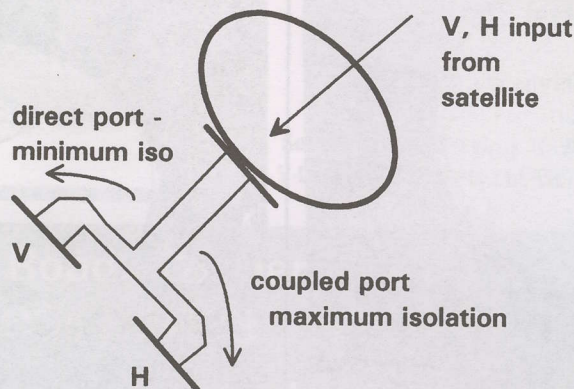
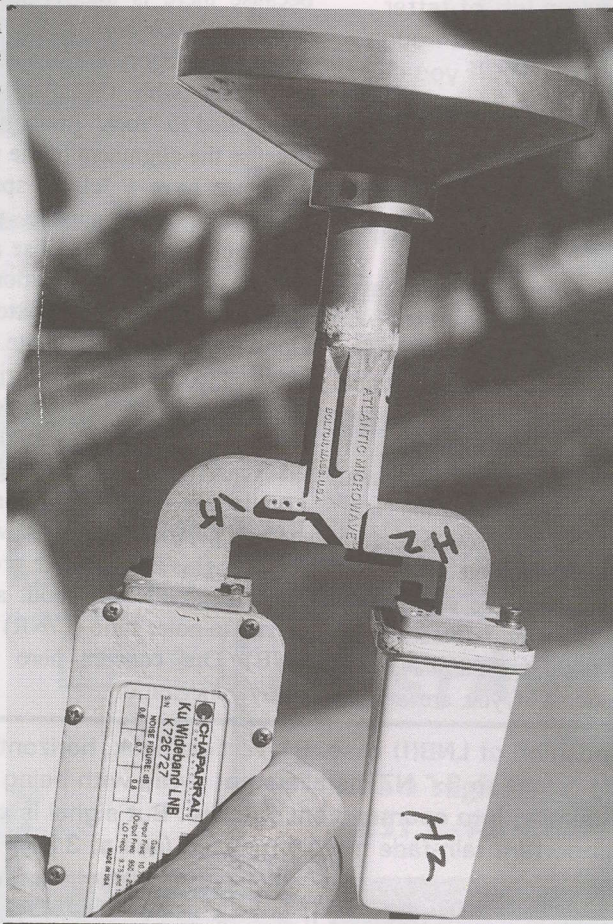
In other words, it is seldom possible (unless you are just dumb lucky) to adjust for maximum desired polarisation signal and actually minimise the opposite polarity at the same time.

Some practical examples

Northern Territory use of Optus B3 horizontal signals is marginal at best; dishes for Austar (for example) must be sizeable (2.4m and larger) and this was the primary reason behind Austar's attempt to serve Darwin and surrounds with a cable television system - dishes for home reception are not



Atlantic Microwave vertical/horizontal ortho coupler separates two polarities for separate feeds to individual LNBs. But the "isolation" is better on the coupled port than direct port.



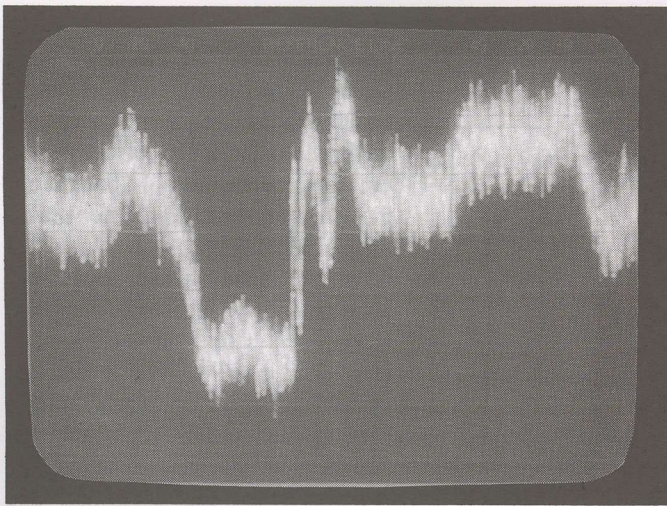
practical there. At the same time, Optus B3 vertical signals are quite healthy in the NT. Which creates a further challenge to effective B3 horizontal reception - "balancing" the stronger vertical and the weaker horizontals.

At sites where both are simultaneously received, one dish equipped with an orthomode coupler is installed. The orthomode coupler is installed. The orthomode "two way signal splitter." Using a mechanical design based upon waveguide segments, the orthomode device separates the vertical from the horizontal and delivers each independently to its own LNB. Ortho-mode "couplers" (signal separators) have two "ports" or outputs with a single input. The feed itself is polarisation neutral. One of those ports is "straight through" while the second is "coupled." The straight through port always has a lower opposite port isolation "value" (dB number) than the "coupled" port.

Which means in the case of the NT, where the vertical signals are stronger than the horizontal, that a proper installation should use the straight through port for horizontal and the coupled port for vertical.

Why? Because at the *coupled* port you will have maximum isolation from the opposite polarity (i.e. the vertical signals will be further "down" relative the horizontal signals). There *will* be a slight trade off - by sending the weaker horizontal signals to the coupled port, there will in fact also be slightly less horizontal signal present there than at the straight through port; a maximum of 1 dB.

The real world. The B3 satellite is approaching an aged situation. And although Optus is likely to deny the following, it is true (as verified by more than 18 months of careful measurements). B3 is no longer unconditionally axis-stable. Picture it sitting off in space above the equator trying its best to remain totally fixed in a spot. But it is subjected to pressures from the solar winds and gravitational pulls from both the earth and the moon. Every day for the past 18 months or so it has routinely begun to "rock" on its axis - like a rocking chair on its runners. This rocking motion is



WHEN B3 horizontal signals are "down" at a location and vertical is "up" it becomes more difficult to "null" the unwanted vertical signals. Here, two narrow-width signals on left of fatter MCPC broader signal are vertical sneaking through the orthomode coupler's horizontal port. If you can "see" (detect) opposite pole signals on a spectrum analyser, you've got reception problems.

very slow, but at the extremes of the motion the satellite is shifting several degrees away from the called-for alignment with earth.

What this does in NT and other disadvantaged locations is rotate the polarisation being received. The vertical and horizontal signals simultaneously rotate as measured from a receiving site by as much as +/- 3 degrees. Now for normal users and uses, this rotation of polarisation is not a problem. But if you are in NT or another similar location where the vertical side signals are already stronger than the horizontal, and you have not been especially careful in adjusting the "null" of the vertical signal polarity, this 3 degree satellite rotation will move the incoming wave fronts such that your "null notch" for vertical is now no longer inside of the very narrow "kill vertical" spot. The satellite, by the way, is creating this unwanted polarisation shift between 0400 and 0800UTC and the shift is counter clockwise. Of course if you are a party

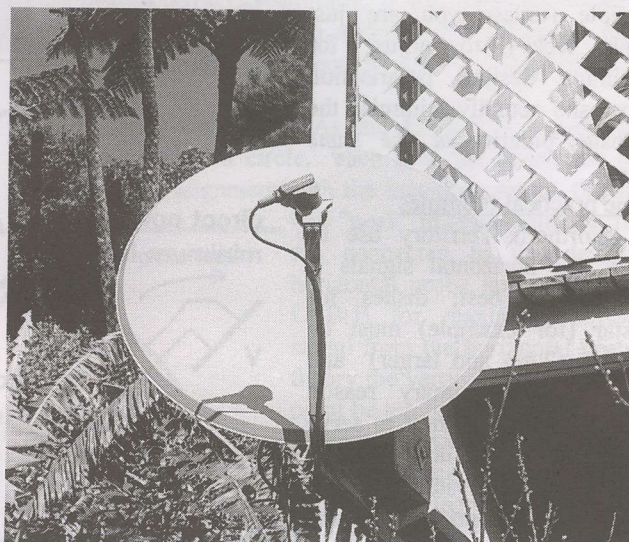
affected by this abnormal behaviour you might run to the dish around 0400UTC (1.30AM NT!) and adjust the feed by a few mm counter clockwise to correct for the satellite's rotation. Unfortunately, approximately 4 hours later you would then have to go back to the dish and return the feed the same few mm back clockwise to return the system to "normal" operation.

What this illustrates is that the digital signals on opposite polarities are extremely susceptible to cross-pole interference. And if the LNB(f) has not been adjusted properly when the dish was installed, you can expect problems. What kind of problems? First off, if you connect a spectrum analyser to the LNB line you may see (1) a reduction in the desired polarity signal(s), and *simultaneously*, (2) an increase in the opposite polarity signals. It helps of course to know what the display looks like when the system is working properly, as a reference comparison for when it is not working. When this happens, the desired signals when subjected to interference will "tile" or drop out totally - either because they are now weaker or because there is interfering data coming from the opposite polarisation. Or *both*.

This category of problem is forecast to become more significant with C1 than with B3. Not because C1 is anticipated to "rock" (it should not for the first five years) but because the alignment of the polarisations will be more critical when we have a "closer spacing" between operating centre frequencies on opposite polarity services. With Foxtel announcing a plan to utilise as many as 12 transponders, they will be on both polarisations simultaneously. Isn't that the same as having Austar/Foxtel on horizontal (as with B3) and Optus on vertical? Not quite. The present frequency alignment between vertical and horizontal has been optimised to minimise this cross-pole-leak condition. The new C1 satellite, based upon the preliminary data released, will not mirror B3 in that regard. All of which suggests that carelessly installed B3 installations (whether for horizontal or vertical) with less than spot-on polarisation nulling will be subject to user problems.

Note: This is a separate problem from that which involved a Hills brand LNB(f) about a year ago. In that situation, the carrier to noise ratio (C/NR) was in question (with a particular LNB). Our concern here is with the C/IR or carrier to *interference* ratio.

CARELESS NZ installs. Note position of LNB(f) case. B1 vertical peak, horizontal null occurs around 7 on clock face, not just "after 6" or "close to 8." NZ installers get away with being careless because presently there is nothing on B1 Hz side coming into country from satellite. But signal is still lost by carelessness and important rain-fade margin reduced (see p. 31).





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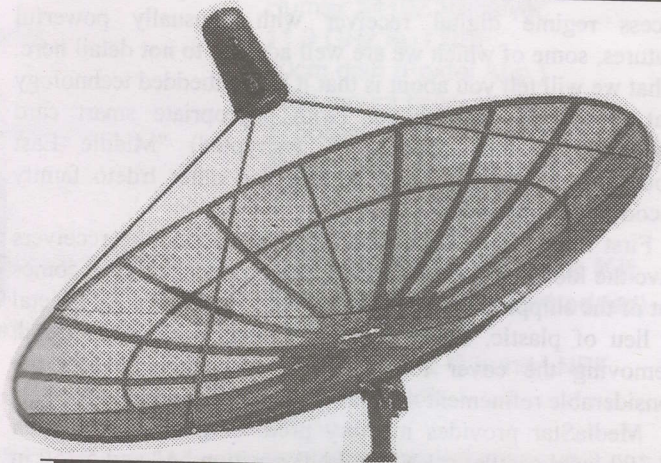
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MediaStar's D-10 does things we can't write about

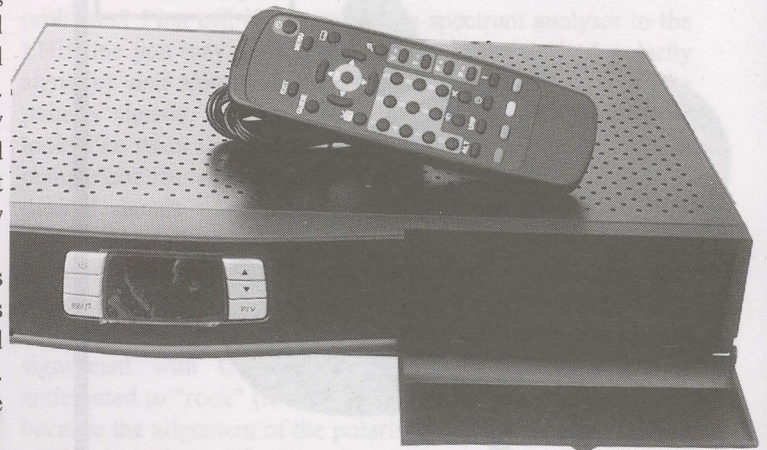
MediaStar's D10 receiver was first shown during Melbourne's SPRSCS 2001 show. It is a FTA plus conditional access regime digital receiver with unusually powerful features, some of which we are well advised to not detail here. What we will tell you about is that it has embedded technology that allows you to recover (with appropriate smart card inserted) the four channel (3 encrypted) "Middle East Bouquet" (3836Vt), Optus Aurora and other Irdeto family encoded transmissions.

First impressions. In an era when many satellite receivers have the look and feel of a lightweight Frisbee, the D10 comes out of the shipping carton with the heft of a "real radio." Metal in lieu of plastic, strong metal that goes against the trend. Removing the cover for an inside inspection reveals the considerable refinement that has gone into this product (p. 12).

MediaStar provides memory preloading for typically an 11.300 local oscillator LNB in LNB position "A" and 5.150 in position "B." This gets you started for both Ku (11.300) and C (5.150) customised searching. In the unit we received for test, the receiver was also preloaded with 12.407Vt (Aurora), 12.336Vt (MediaStar), 12.313Hz (pay-TV - this transponder carries the NIT or Network Information Tables for the full range of pay services and features an easy to remember Sr at 30.000), as well as C-band's European Bouquet (4.000 Hz). This relatively minor preload will with suitable dish and cards create approximately 250 channels of service (radio and TV combined). Expansion of the memory to include other services is straight forward as the "menu tree" (below) suggests.

- 1) Access main menu by selecting "menu" on remote
- 2) Scroll and select "installation"
- 3) Enter password (default is 9949)
- 4) Scroll, select "tuning"

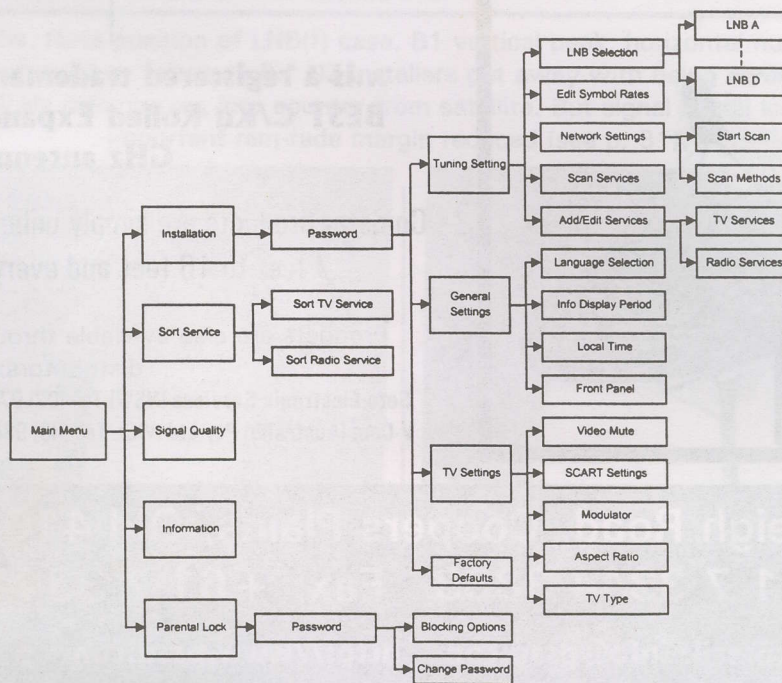
5) In sequence, select and enter the appropriate LNB data for the transponder you wish added to memory (four separate LNB data memory positions are definable), then the symbol rate (SR - see table in any issue of SatFACTS). The D10 does something interesting here - there are default symbol rates in memory of 22.000, 27.500 and 29.900. In this data entry position you are asked if a new addition is required. Once



done, it becomes a part of the SR data base for future searches. Next is "Network Settings" and here they want to know the downlink frequency. This creates a sub-memory for the specific transponder to be subsequently scanned (accessed). Network setting is your "home file" for a specific transponder.

Scanning. Here is something long ago tried but seldom done properly. Selecting the "scan" services presents two choices: (1) "Band Scan" which automates a full 950 - 2150 (MHz) L-band search, or, (2) "Network Scan" which looks for the specific transponder you selected in the previous steps. Band Scan is one of those, "Gee we wish we had such a program built-in," desires than many enthusiasts opt for. Our prior experience with this feature (SF#79, p. 10) was someplace between miserable and barely acceptable. The real enthusiasts have gone to a DVB2000 subroutine with a Nokia receiver and

anything other than this approach involves some frustration. And the D10? Someplace in the middle - a busy satellite (As3, As2, PAS-2) can take three + hours to work through. The D10 does not give you the ability to specify "margins" (lowest L-band start frequency, highest L-band stop frequency) - it runs the 950 - 2150 range once you select "Band Scan" and press "OK" and that's too bad as few of us want to scan more than a segment of this wide range (more exactly, 950-1450 for example).





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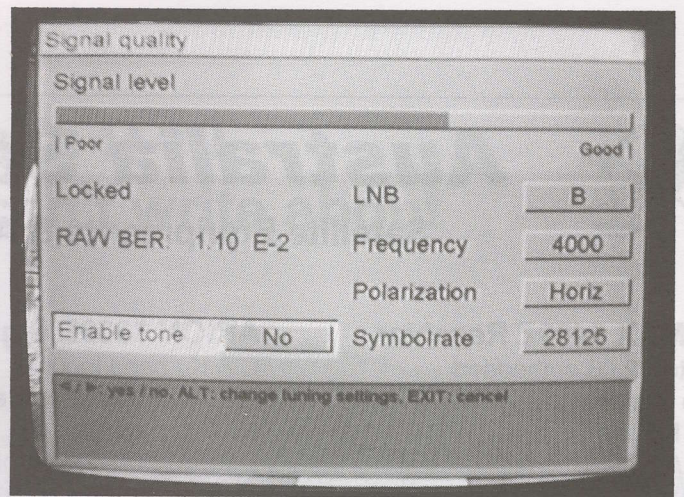
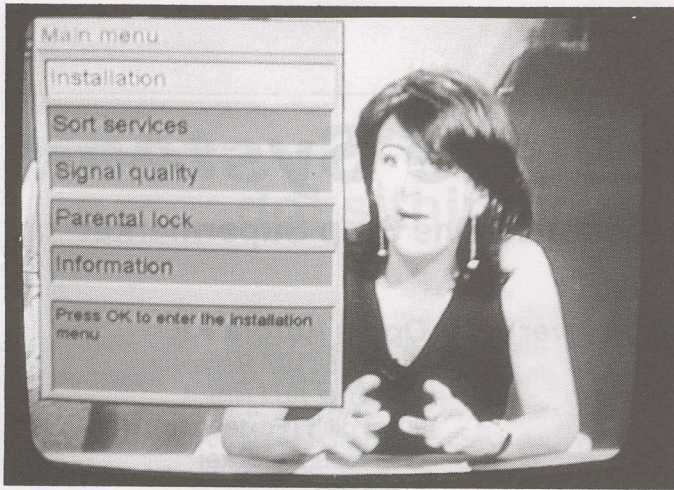
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MAIN menu access leads you (as shown in diagram on p.10) to sub-menus (left photo). Signal quality is one of the real subroutines of value, actually showing BER (bit error rate) of reception which makes an excellent tool for installation peaking (right hand photo) including cross-pole nulling (see p. 6).

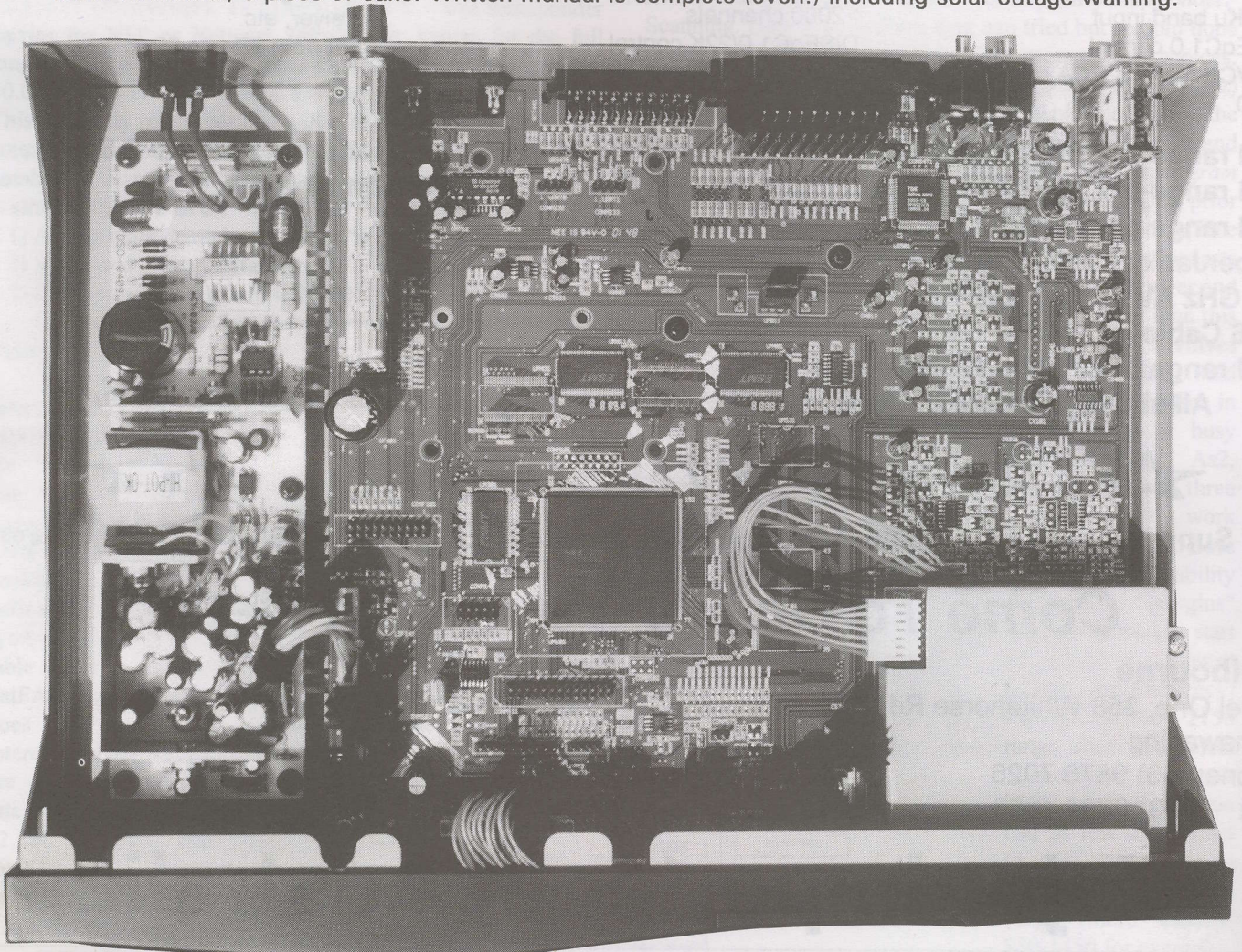
Sorting

Once a scan is completed (whether Network or Band) the receiver does a sort placing channel designations into an alphabetical list. As Jacob Keness of MediaStar correctly points out, once to this stage you can use the "Deselect" list menu to rearrange channels as you wish - placing the most

viewed ones, for example, at the start of the list (takes less time to locate them when you are doing a channel change).

Let's say you are watching SBS SE through Aurora. And want to switch to one of the Middle East Bouquet channels from PAS-2. The receiver knows in memory the parameters for each, including which LNB (from the four possible) to switch "on." Of course Aurora requires one Irdeto format card

INTERIOR chassis of D10 is extremely well laid out making service work (assuming a service manual is ever made available!) a piece of cake. Written manual is complete (even!) including solar outage warning.

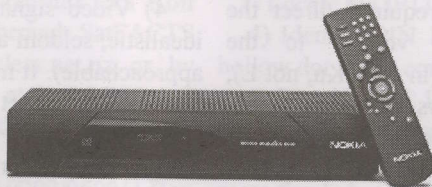


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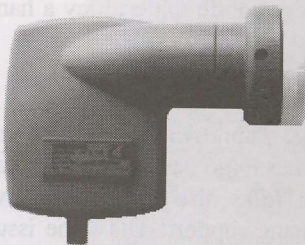


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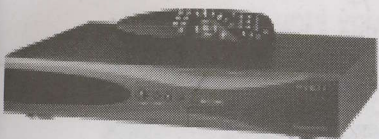


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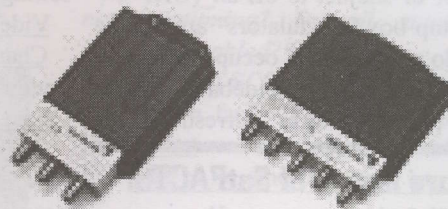
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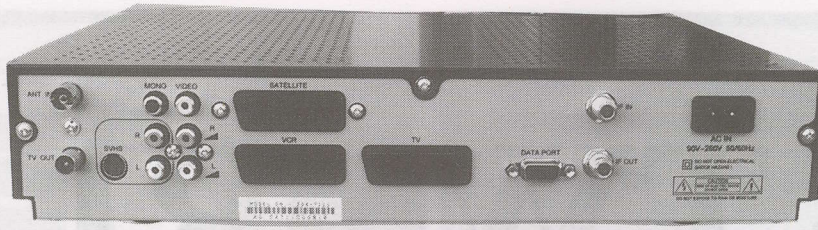
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while the Middle East package (such as LBC) requires a different Irdeto card. From the menu you would select LBC, pop the Aurora card out of the smart card slot and pop in the Middle East Irdeto (2) card.



channel so set-top modulators must be at least last channel-in-use + 2 and preferably next channel-in-use minus 2 (channels) as well. (See SF July 2002, Soapbox p. 29)

Adding

The fifth choice within the "Tuning Setting" sub-menu involves the quick addition (or editing-change) of a new transponder. The menu here is quite unique but requires prior knowledge of the full transponder parameters. You specify the LNB selection, polarity (which will as required direct the receiver's LNB polarisation switching voltage to the appropriate antenna probe), the frequency (in C or Ku, not L), Symbol Rate. Then if you know the numbers, the video, audio, PCR and even TT (teletext) PIDs. Pushing the P+ button on the remote sends the receiver into a search and load routine for that specific transponder or service. A similar routine is available for adding or editing radio service channels.

SCART and outputs

The TV SCART socket (rear panel; above) provides menu selections between RGB, Composite and S-VHS. The VCR SCART has two options - Composite and S-VHS. When either SCART is in use, pin 8 of the socket can be menu toggled between "signal detection" on or off.

Modulator

The UHF output (modulator) is pre-programmed with PAL B/G (B = 625 lines, 7 MHz channel width, [FM] audio +5.5 MHz reference video/vision carrier while G is 8 MHz bandwidth, other parameters the same), PAL-I (I = 625 lines, 8 MHz channel width, [FM] audio +5.996 MHz reference video/vision carrier), and PAL-M (a confusing standard as it essentially emulates NTSC system M: 525 lines, 6 MHz channel width, [FM] audio + 4.5 MHz reference video/vision carrier). Modulator channelling follows PAL G from channel 21 to 69 (21 = 471.25, 69 = 855.25 in 8 MHz steps). The default here is channel 38 (607.25).

Some installers report increasing problems with default settings on modulators. Consumers somehow manage to get their set-top box units back onto a default UHF channel, which as often as not is a source for or subject to off-air (UHF TV broadcast) interference. Set-top box "modulators" are double sideband, which means they do not "cleanly" occupy a single 7 or 8 MHz channel width. Rather, double sideband creates interference which falls on the next lower (terrestrial) TV

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Specifications

The D10 official model number is ZDX-7111 and it has the following parameters:

- 1) 950 to 2150 MHz
- 2) DiSEqC 1.0 plus 22 KHz
- 3) Data rate from 2 to 45 Mb/s

4) Video signal to noise claims 55 dB. This is a rather idealistic, seldom attained in practice, number (52 dB is more approachable). It means that through a SCART (or companion Video RCA socket) the baseband video will have 55 dB more signal than noise. It does not mean that through the UHF modulator the demodulated RF video signal to noise will approach 55 dB (48 dB is a more likely number).

5) Memory: RAM 4 Mbytes; Flash 2 Mbytes; Non-volatile 4 Kbytes.

6) L-band input connections - loop through

7) Powering 90-260 V AC, 50 to 60 hertz (a robust but fairly standard SMPS design)

8) Current use 40 watts (a tad high or perhaps they have not measured it accurately; after 7 days of continuous operation, the impressive metal case was very comfortable to lay a hand upon).

9) Weight 3 kgs (remember the heavy duty metal case).

Performance

Some folks believe we give "approval marks" to any receivers submitted for test. One has to go back no further than SF#79 to see otherwise. Some folks also believe we give "approvals" in return for advertising support. The same issue just cited cost us all future advertising from Astrx; the Hong Kong firm behind the receiver tested. We'd rather be honest than ply the advertisers (current or potential) with glossy reports. That said:

This is a good quality IRD - here's how we rate it.

Sensitivity: Good, not the best. On a scale of 0 - 10, 8.

Stability: Excellent (lose a signal in a rain fade, it holds the setting and comes back on without further attention).

Video quality: Good, not the best; 7+.

Channel changing: Very good, within a bouquet 9, changing bouquets 8.

Ease of use: Very good, 9+.

Quality of (manual) instruction: Very good, 9+.

What's missing? Irdeto only; SECA and others would have been nice but you won't do them here. This is an "embedded" receiver, which means you won't be inserting any "all" CAMs into the singular smart card slot for expanded opportunities. On the other hand, if SECA is your thing - come back next month for a review of the Simba receiver. SECA? Does French TV Canal-Plus and AsiaSat 3's Zee TV.

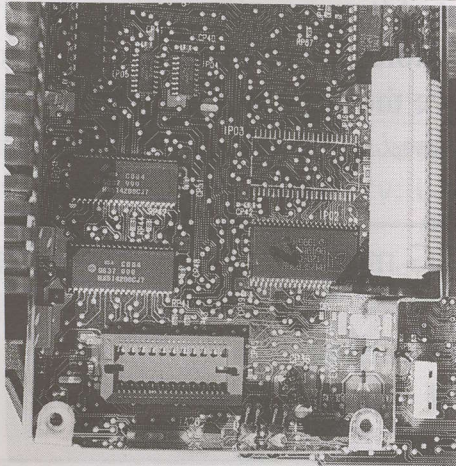
Source: Contact Jacob Keness, MediaStar Communications International (OPAC) Pty Ltd., 24 Bosc Road, Ingleburn, NSW 2565, Australia. Telephone 61 2 9618 5777, Fax 61 2 9618 5077. Email Opac@bigpond.com.au. Jacob is a low-profile, long time participant in the Pacific satellite scene - and was the first (as in, *very first*) to import Panasat's original 535 series digital receivers back in 1996. A good person.

Build a BDM or Faster Channel Zapping? Rolf Deubel Answers Questions

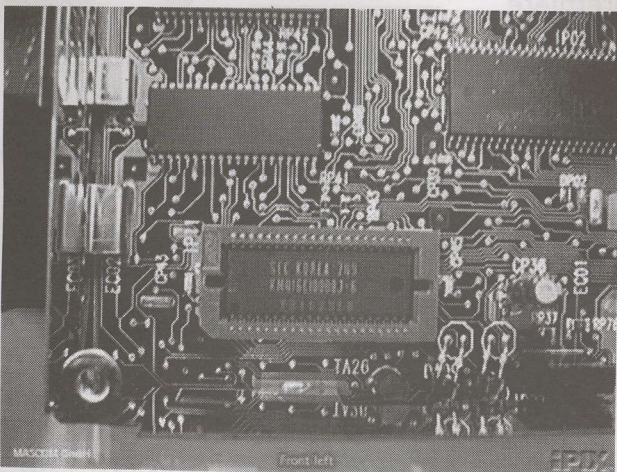
Reaction to our Nokia-slanted information in the July SatFACTS has been phenomenal. So we have prevailed upon Rolf Deubel, deeply involved in his own "writing project," to provide technical answers for "newbies" who need a knowledgeable source to answer their questions. A significant portion of what follows was created by MadMax aka Rolf Deubel, personally. You can contact Rolf through SatFACTS as (header) "MadMax" at Email skyking@clear.net.nz, or, by mail (or fax - 64-9-406-1083) as "MadMax, at SatFACTS, PO Box 330, Mangonui, Far North, New Zealand."

Souping up the RAM

RAM speed equates to how fast your 9200/9500/d-Box performs the calculations (functions). Nokia obviously had faster speeds in mind when the IRD was designed because they very conveniently included a socket in the receiver where a souped-up RAM could be added by the user at a later date. SF#95 displayed the socket (p. 15) but made no comment concerning its capability (see below).



SOCKET IP11 is located beneath the tuner and adjacent to the Flash chipset, This socket has nothing in it until you upgrade (below; see text).



A number of perhaps suitable chips have been acquired and tested and there is one which is head and shoulders better than

the balance. It is the KM416C1000BJ-5 manufactured by SEC Korea. The (-5) designates the access time in nanoseconds.

- 1) Open and remove the Nokia outside cover.
- 2) Remove the satellite tuner card-part on the left hand side of the chassis (see p. 15, SF#95 for steps).
- 3) Locate the IP11 socket (see photos here).
- 4) Identify PIN 1 in the KM416Cx RAM chip (this has a hollow dot in the corner to help identification).
- 5) Identify PIN 1 on the empty chip socket (located at the cut-off edge of the socket).
- 6) Align PIN 1 on the chip with PIN 1 on the socket and press firmly but carefully into the socket.

Viola! You now have 3 MB RAM, a 200% increase from the stock unit. Reassemble the receiver (tuner board, case top) and enjoy the largest of teletext pages as well as the fastest channel zapping you have experienced.

The result is similar to modifying a vehicle engine. You can "blueprint" an engine and get similar results but nothing will replace the capacity of a sizeable V8 engine block. This warning. A number of other similar "sounding" RAM chips have been tested - none work as well (some not at all) in this configuration.

Queries

"I have SCSI and null modem and can use these for software loading. Is there any advantage to my having a BDM unit?"

Answer: If you have SCSI and the DVB2000 software later than 1.82.6, you are all set. This has the SCSI up/download functions in VGrabber or DVBEit5.6 and you are away.

However, not everyone has this on board. What you see here (p. 18) is a do-it-yourself BDM Interface. The parts are common (Dick Smith and others). There are two "steps" to this - the actual parts layout (board schematic) and the layout for the PC board itself. Double check board layout size versus parts before starting!

Query: "Is it true some model Nokia have SCSI on board but not functioning? Do all autosearch tuners have these functions enabled?"

Answer: If SCSI is on board and not-working, that suggests a hardware fault. If the DVB2000 software is installed, the SCSI must work. SCSI does not work with non-DVB2000 firmware as no other firmware has the functions implemented.

Query: "Is it true you must have Windows 95 (or later) to run the BDM?"

Answer: Not true. The BDM is not OS (operating system) related but of course the software in TranxBDM (software) is a Win9x/Windows ME program. It will not work with Windows XP (XP grabs the ports and controls them - which means TranxBDM can not locate a port to work with).

Query: "Any reason why BDM cannot be linked to the PC through LPT1 or LPT2 port?"

Answer: In fact a BDM interface works only on LPT (printer) ports and not on COM ports at all. Either of the (2) standard LPT ports will function.

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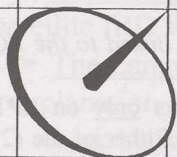
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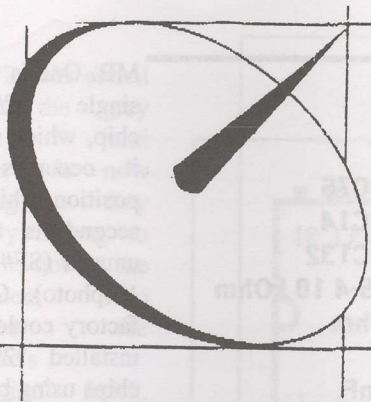


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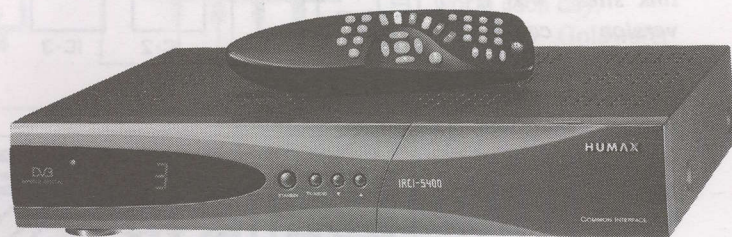
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Query: "I have only been using the normal DVB2000 2.05 and have never tried any 'hacked' or 'patched' versions. What I did download on one of the Nokia link sites was a version calling itself 'DVB2000b8 magic'. I believe it to be a V2.08 Beta which has been patched. Do you know?"

Answer: There are many approaches to 'skinning a cat' and one of the aspects of the Nokia-army is that people keep trying to become 'famous' by creating their own subtly different versions. 'Patching' on top of somebody else's lengthy work is one way to attract personal attention. Our experience is most patches (but not all!) are versions that somebody has given a fantasy name - most likely the 'Antares Patch'.

Query: "What is the Sally version patch you spoke about? I am keen to know of software I could load into my box to enable 'cardless' viewing."

Answer: We report about these software versions as a matter of being complete but do not support this particular activity. Stock response? Go to Internet.

Query: "With DVB1.82.0 Sandra loaded how does one get to the CAM menu? Does it only work with a modified CAM?"

Answer: The various 'girl' versions of DVB2000 (Sandra, Sally and others) have no 'secret' CAM menu anymore. One of the more current is 'NoOneManIT' which is a patched version of Sandra for Multicrypt. Apparently it allows viewing without a card as well as Multicrypt with a 'Wanissa' CAM mod. See Internet for more information..

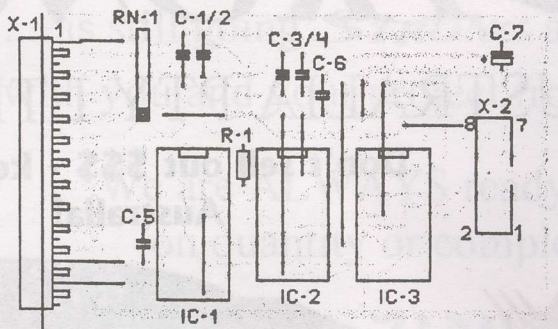
Query: "All of this excitement concerning software that allows one to view without a card (or anything electronic - in fact nothing else) in the card slot; would that mean that if one knew the secrets of the system, he/she could watch say the SBS, ABC and Sky racing on Optus B3, 12.407Vt?"

Answer: That is what it means.

Query: "My Nokia has 1 meg installed but have not opened the box yet to see if a spare RAM slot is available. Is there another way to tell other than taking the receiver apart?"

Answer: There are always two solder points (not a socket or slot) but there are two ways for the factory to have achieved 1

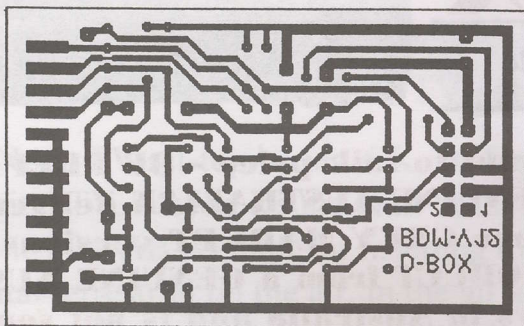
BDM Interface



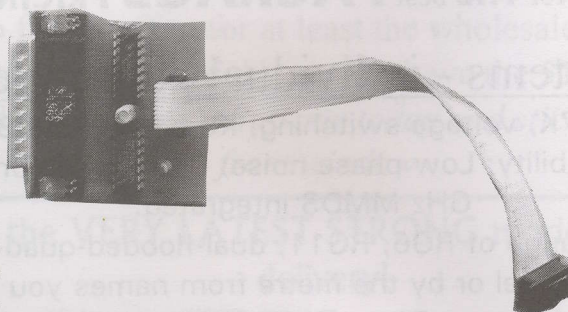
IC-1 74HC76
 IC-2 74HC14
 IC-3 74HC132
 RN-1 SIL 5-4 10 kOhm
 R-1 1 kOhm
 C-1-4 1nF
 C-5-6 100nF
 C-7 33uF / 16V
 X-1 25 pol. Sub-D male
 X-2 10 pol.

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X2: 1=n.c.
 2=n.c.
 3=GND
 4=Dsclock
 5=GND
 6=Freeze
 7=Reset
 8=DSO



SCHEMATIC and layout for BDM (above); what it looks like (below).



MB. One is with a single 29F800 chip, which means it occupies one position while the second is totally unused (SF#95, p. 15 photo). Or, the factory could have installed 29F400 chips using both of the positions - also totalling 1 MB. If you have a BDM interface, the menu will lead you to a receiver check-up and there you will see both the amount of RAM and the number of chips 'inside' - with only taking the cover off!

Query: "Does it make any

difference for the sequence of stacking chips? If one position has a 29F400, and the other has a second of the same chip, should one of those come off to expand the memory with a 29F800 or can I simply tack a 29F800 on top of one of the two 29F400s?"

Answer: Stacking the 800s on top of the 400s is a no-no. We mentioned in SF#95 that some Europeans have stacked 2 x 29F800 in each slot (for a total of 4 x 29F800) and included this as a

matter of completeness for the report, not as a step many would or should take. In fact, if you have 29F800 in both positions for 2 MB total RAM in the (Flash) memory, and then have the 3 MB in the system RAM, that is not only as far as we recommend but in fact more than enough for the Pacific and Asia. The Europeans who have stacked two 29F800 in both Flash positions have as many as 2,000 (+) channel loadings to keep track of - far more than you or I now have or are likely to ever need.

Query: "You mention the d-Box 2. I understand it is basically an upgraded d-Box (1) - true?"

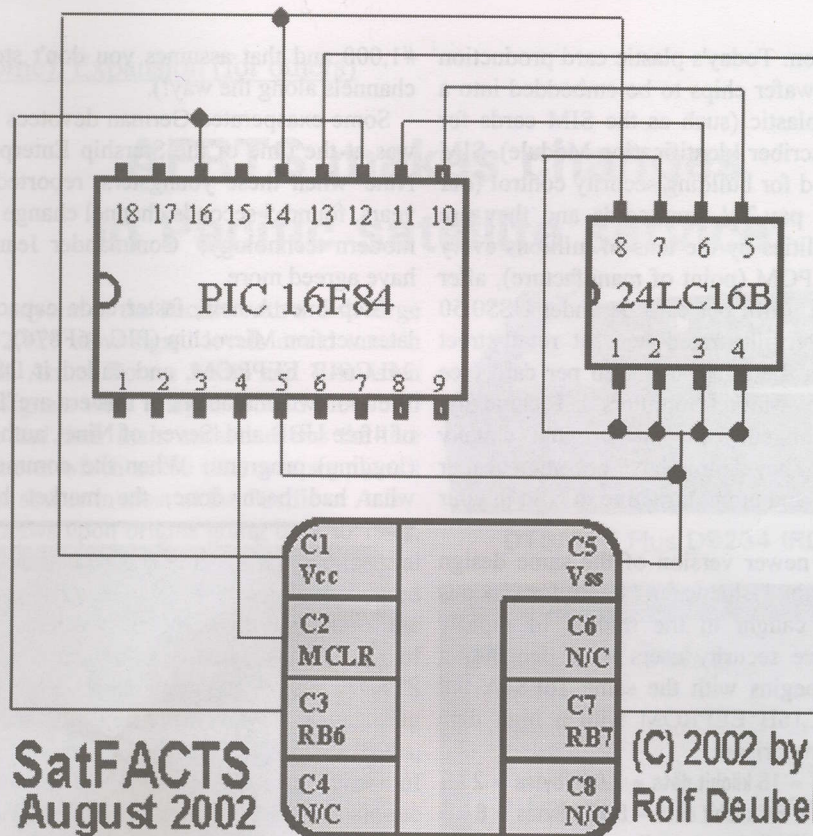
Answer: Not true. Just for openers, ponder a receiver with a built-in (4") LCD screen so you don't need anything but the IRD to watch television! Then add the specially created (in Germany, of course!) 'Open Source' based Linux firmware and yes, we'll have a full report for you here in SatFACTS.

By the way - on August 2, a Spanish citizen was arrested in Hamburg (Germany) charged with reselling more than 3,000 d-Box 2 receivers. The original marketing plan "rented" d-Box 2 units to homes in conjunction with a 6 month 299 Euro payment. The plan included the consumers returning the d-Box 2 units to programmer Premiere if they failed to renew the service after 6 months. Apparently a large quantity of the

d-Box 2 units ended up in the grey market and Premiere is now insisting they properly belong to them, not the consumers who supplied the Spaniard's "collection" fetish. There were 3 manufacturers of the d-Box 2: Nokia, SAGEM and Philips with an original price of 599 Euros.

Nokia data web site:

While they are constantly changing, the most complete is typically <http://sat-digital-tv.provider.pl>. Press the English flag.



verify nobody is close by, pounds four numbers into a waiting keyboard. If her card's data is verified by her four number entry, the door unlatches. It happens millions of times all around the world each day.

The Goldwafer card. This name comes from the plastic card stock's colour. Another, more technical, name is "PIC Card 1" which relates to the PIC 16F84A (IC) device embedded into the card stock. PIC? Programmable Integrated Circuit.

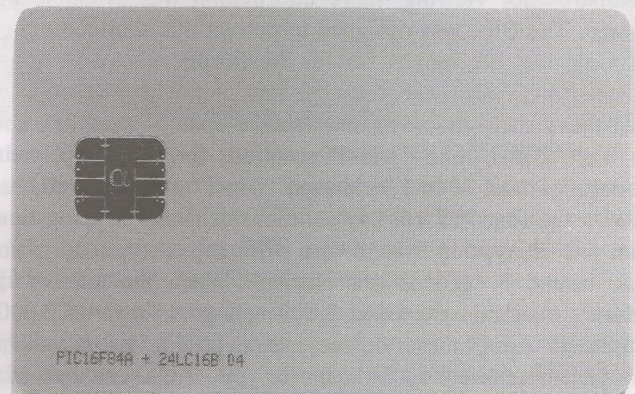
This is actually a very old (pioneering era) design which in

What is a Goldwafer or a Silver card?

Smartcards have become very much a part of our daily lives. If you look around you and your normal activities, you will identify smartcards being used in hundreds and thousands of applications. It begins with the cellular (telephone) SIM card, the latest version credit cards with a chip on board to the modern (for now) pay-TV CAS (conditional access system) smartcards. Knowledge of how a smartcard is designed, and its capabilities, will improve your understanding of how rapidly many other daily functions are now controlled or even limited by this nearly twenty year old technology.

Many business firms have replaced conventional door locks with smart card access, often backed up by a "pin number" routine as well. A nurse entering a laboratory in your hospital first inserts her personal smart card in a slot, waits for an approving (typically green) LED to blink on the door-side mounted grey box, and then checking over her shoulder to

our industry goes back to the launch of the four Sky analogue pay-TV channels in Europe. At that time it was manufactured



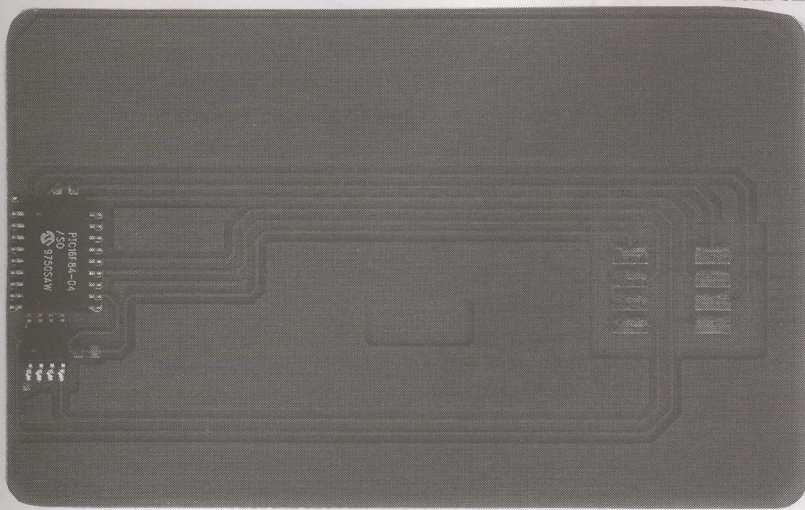
FIRST version Goldwafer cards further reduced physical size of component parts.

EARLY PC version smart cards used G-10 or equivalent "PC board" with chunky parts.

from single component parts: (a) piece of PC (printed circuit) board, a PIC 16F84 (IC) which held in memory the processing instructions and a companion 24LC16B EEPROM, present to update data in use.

The first versions of this were "handmade" and actually looked quite ugly and altogether too "open" for the folks who wanted them to perform a "security" function. The next versions looked prettier but retained the same general appearance, using SMD (Surface Mounted Devices). The "security" was marginally better but everything a curious person wanted to know was only a clip lead away from detection. All of the basic functions were there - unfortunately access was so simple that one did not have to be a technician to get "inside."

Over time - and not much time at that - the SMD version matured into something much more difficult



to unravel without permission. Today's plastic card production methods allow tiny silicon wafer chips to be embedded into a credit-card-sized piece of plastic (such as the SIM cards for cellular phones (SIM? Subscriber Identification Module). SIM family cards are also utilised for building security control (our nurse as an example) and pay-TV smartcards and they are manufactured in Asian facilities by the tens of millions every month. The "real" price at POM (point of manufacture), after granting the manufacturer a profit per card, is under US\$0.50 each. The plastic Goldwafer illustrated here at retail-street level should be available in the range of US\$6 per card (see SatFACTS #93, p. 15, "Grey Market Suppliers"). Technically, virtually nothing has changed from the original chunky looking PC board versions. They simply have become cheaper to produce, slightly thinner, and more attractive to hold in your hand.

The Bluewafer card. A newer version of the same design followed and it was named the "Bluewafer," again for obvious reasons. The "Blue" was caught in the middle of rapidly advancing technology where security users were demanding more capacity. The Blue begins with the same 16F84A but replaces the original 24LC16B EEPROM with a high data storage model. Here is a comparison:

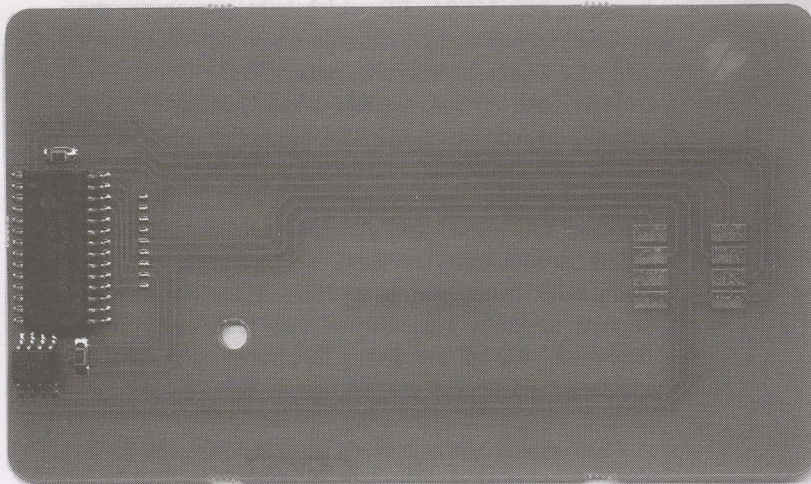
Goldwafer: 24LC16B EEPROM = 16 kilobit data = 2.048 bytes = 2 KB

Bluewafer: 24LC64B EEPROM = 64 kilobit data = 8.192 Bytes = 8 KB

The Bluewafer was created primarily for the rapidly expanding European market. New decrypting technologies for pay-TV and their scripts had become public. Multicypt was the new "hot button" phrase. As more providers became "available" for viewing, more information was available for storage. The Blue was designed to correct this shortcoming of the Gold but life moves fast in the European pay-TV lane. Even before Blue was well and truly into the marketplace, even more encryption systems became openly accessible and the first "2-in-1" and "3-in-1" solutions for Multicypt were soon out of date; "4-in-1" and even "5-in-1" were required.

With the first PIC 16F84 "solutions" channel zapping time from one encryption system to a different encryption system took around 5 seconds per channel. When the number of channels available exceeded 1,000 and grew towards 2,000, consumers using these devices were finding plenty to be annoyed about (we'll do the math for you - 1,000 channels at 5 seconds per channel requires 83.33 minutes to zap from #1 to

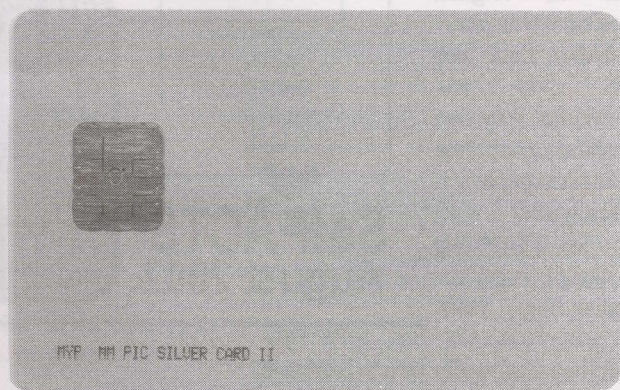
24LC64B EEPROM replaced the slower 24LC16B and higher speed zapping (the "DS9) was born. But it was initially "chunky" like first card versions.



#1,000 and that assumes you don't stop to watch any of the channels along the way!).

Some exasperated German devotees tackled this problem. It was at the time of the Starship Enterprise series 'Deep Space Nine' when these youngsters, reportedly between 15 and 18 years, found 5 seconds channel change totally out of sync with modern technology; Commander Jean Luc Picard could not have agreed more.

Step one: A new, faster code capacity. They began with a later version Microchip (PIC 16F876), married it to the proven 24LC64B EEPROM, and called it DS9 (Deep Space Nine). Well known characters of this era are 'Locutus of Borg', admin of 4free UBB and 'Seven of Nine', author of MLog data stream (logging) program. When the commercial folks worked out what had been done, the market began calling the new



SILVER card is the faster "DS9" commercial version of the original (gold) wafer card providing (especially for Europeans) faster channel zapping of channels stored in memory.

technology PIC Card2 (obvious successor to PIC Card1).

The 16F876 basically provided a faster "CPU" with more memory on board. Channel zapping time improved - from 5 seconds to between 1 and 2 per channel change, The first 16F876 "cards" were hand wrought using the same PC board technology of the original pre-Gold-wafer format. But the commercial folks knew a good prospect when they saw one and shortly the DS9 Silver Card was in the marketplace. If the German youngsters who started this evolution only wanted faster channel zapping between their favourite episodes of "the final frontier," the commercial guys and gals have more lucrative rewards in mind.

The "Green Card" was born (not to be confused with the USA work permit card!). Yet more memory - start with the PIC 16F876 from DS9 and add a 24LC128 EEPROM for 16 KB of storage. Naturally price is a consideration and the user should balance what his system must do in its local environment before investing.

Do you have 2,000 or even 1,000 channels to zap through? Not unless you are a European reader of SatFACTS. Speed and memory are price sensitive and here are some guidelines:

Goldwafer - region of US\$6 to US\$9

Silverwafer - region of US\$12 to US\$15

Greencard - region of US\$20 and upwards

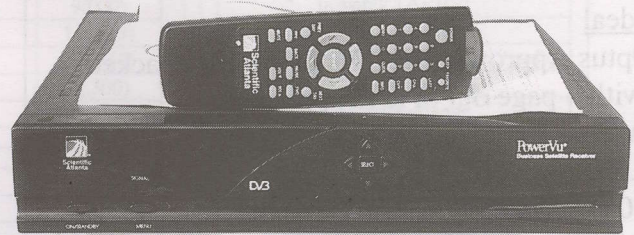
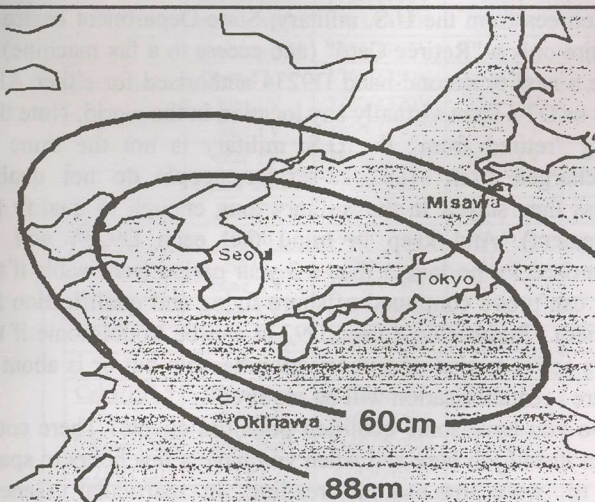
We'll continue this knowledge-based series with the line of AVR micro controllers used on 'Jupiter' and 'Funcards' in a future issue of SatFACTS.

AFRTS makes changes in Pacific satellite service

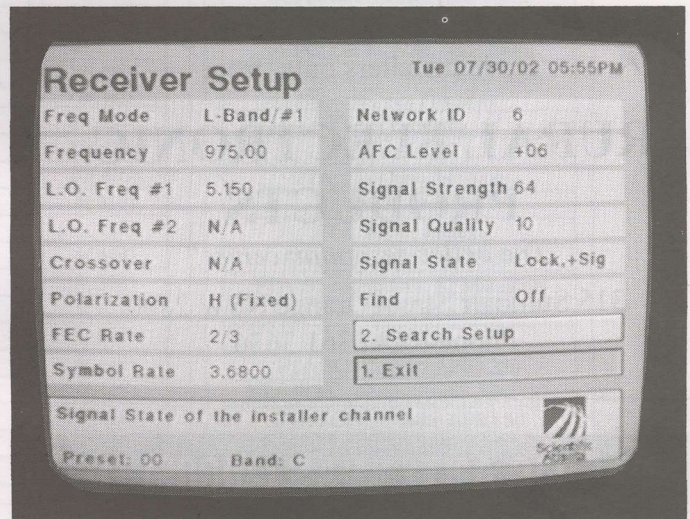
As recently as 1990, anyone in the Pacific with a dish large enough to deal with +27/29 dBw signal levels could tune-in free to air the American Armed Forces Radio and Television Service; AFRTS. The signals were relayed around the world using NTSC + Intelsat and their main attraction was the live coverage of sport and news which at the time was simply not available from any other source in most of the Pacific or Asia.

But AFRTS, which draws upon origins going back to 1942, has to play the same game in the same court as the commercial folks. Live coverage of sporting events, for example, delivered through FTA analogue satellite interfered with the sale of the same sporting event to commercial outlets in hundreds of countries. The sporting rights owners complained and AFRTS adopted analogue (B-MAC) as an interim solution to securing the programming from unauthorised eyes. By the mid-1990s, just as B-MAC was coming to a natural close in favour of PowerVu digital technology, a number of B-MAC analogue decoders revised with hacker chips began to appear, especially in the European market. These reworked B-MAC receivers were expensive (over US\$2,500) with the hacker chip but a few did make their way to some out of the way Pacific Islands (Tonga, for example).

AFRTS today operates two related but separate services. The original single channel AFRTS service has been replaced in digital with AFN (Armed Forces Network). This service has been available on C-band (I702/176E: 4177LHC, Sr 28.000, 3/4) on a global beam delivering 29 dBw at beam edge. That translated to a 4m to 4.5m size dish. AFN Plus is a 7 TV channel service (+ 5 radio channels) using PowerVu's variant to MPEG-2. The service is of course conditional access although many have found some of the audio channels to be audible with non-PowerVu equipment. This service is now moved to I802 on a Ku spot-beam which is designed primarily to cover Korea and Japan (in map below, centre circle is 60cm while outer circle is 88cm) with the following parameters: LO of 9750, Ku input of 11.638, Sr 28.000, 3/4, Network ID of 1. The I702/176E C-band service has been shut down. However,



DTS/AFN Plus D9234 IRD; installation menu



the DTS (Direct to Sailors) service on I701/180E continues and throughout the Pacific beyond Japan and Korea, those who were authorised for the AFN service are busy readjusting their dish systems to the DTS parameters (180E, 4173.5 LHC [976.5 L-band], Sr 3.680, 2/3, Network ID 5).

DTS is an interesting service, even if you cannot access it (although like AFN, many report their receivers will at least deliver the audio of one or more radio services). AFRTS/DTS recommends that users have a 1.2m dish (yes, this is C-band!) and the concept is that ships at sea with tracking dishes can tune-in the service with relatively simple (although CA) equipment. The 180E footprint is global, taking in essentially all of the Pacific and much of Asia (west to Perth). There are 3 TV programming channels crammed into the MPEG-1 (not a misprint) SA formatted minuscule 3.680 symbol rate: AFN Pacific TV, AFN News (TV), and AFN Sports (TV). Plus 3 radio services. On a properly loaded (and authorised) D9234 receiver, they come up as 0301, 0302 and 0303. The radios are multiplexed in the SA audio data stream and accessed by selecting the appropriate RCA audio socket on the rear of the receiver (301: General entertainment TV with programme audio on audio 1 left, music [radio] audio 1 right; 302: News TV with programme audio on audio 1 left, VoiceLine [radio - special announcements] audio 1 right; 303: Sports TV with programme audio on audio 1 left, music [radio] on audio 1 right.) The loss of AFN Plus's 5 channel service is sad news far many beyond the military. AFRTS routinely provides "full" service to embassy, consular compounds as well as (U.S.) government sponsored or affiliated projects.

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In fact, many who would qualify for AFN Plus (where available) and DTS (where AFN Plus is not available) very possibly do not know of their "qualification status."

Acquiring a decoder is step one. The key phrase is, "military shopping privileges." A service referred to as "The PX" (AAFES/NEX) operates wherever there is a US installation of any size. "PX" is a store where US goods are available, often at pricing which is "concessionary" to the folks allowed to shop there. The US Government backs suppliers down to their largest volume discounts, adds on something for shipping the goods to a distant point and tacks on a small amount again for break-even maintenance of the PX. The net result is a D9234 sold through a PX typically goes for as little as US\$750 - well below the US\$1200-plus region charged through Scientific Atlanta's corporate outlets.

Acquisition of a decoder is only step one - it will do you little good until authorised. Now, *who* can be authorised? AFRTS advises, "only active duty U.S. military, Department of Defense civilians, State Department personnel and their family members, and military retirees."

AFRTS further advises, "The Armed Forces Radio and Television Service (AFRTS) acquires the rights for the programming (you see) on AFN Plus (DTS). Program providers give AFRTS the rights to their programming at little or no cost, as a public service to U.S. military (and others) stationed overseas. This programming is worth a great deal of money - commercial networks commonly pay hundreds of thousands of dollars for individual episodes of popular programs. To ensure that it continues to receive programming at little or no cost, AFRTS must promise that only the authorised audience will be able to view its services.

"Your PowerVu decoder is one part of an elaborate security system that protects (AFRTS) from unauthorised audiences. AFRTS must authorise (turn on) each decoder individually, over its satellite links, from the (AFRTS) broadcast center near Los Angeles."

Resale of decoders

Active military have their decoders authorised for a period of time which corresponds to their overseas stay, automatically. Retired U.S. military/DOD/State Department personnel living outside the U.S. are given three years authorisation time (the so-called DEROS or Date of return from overseas to U.S.) and renewal past this date is routine (but time consuming). D9234s cannot be sold outside of the "authorised family" of users but they are routinely moved in "used" markets *within* that group of people.

Retirees from the U.S. military, State Department basically require only a "Retiree Card" (and access to a fax machine) to have a new or second-hand D9234 authorised for either AFN Plus or DTS from virtually any location in the world. Note that being "retired from" the U.S. military is not the same as "discharged from" (i.e., ex-service people do not qualify unless they stayed in the military long enough to qualify for retirement). And keep in mind that each D9234 will be authorised for no longer than a 3 year period (renewable if the user can prove continued offshore living and qualification for service). Purchasing a used D9234 can be troublesome if the unit's active period of authorisation has run out or is about to expire - reauthorisation will be required.

Do you have some qualified potential clients? There could be an install job here and when you have a few hours to spare, go to www.afrts.osd.mil reading in particular General Information, Technical Information and FAQ.

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 August 2002

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	
Them3/78.5	SkyChAust	3695/1455V	up to 3	3/4	5(.000)	
	MRTV-Myn	3676/1474H	1	2/3	6(.000)	
	MidEst Mux	3640/1510H	up to 12	3/4	28(.066)	
	Mahar/DD1	3600/1550H	up to 8	3/4	26(.661)	
	ME Mux	3569/1581H	up to 4	3/4	9(.000)	
	Nepal TV+	3554/1596V	3+ in mux	3/4	13(.333)	
	3ABN +	3551/1600H	4+ TV, radio	3/4	13(.330)	
	JAIN TV	3538/1612V	1TV	3/4	3(.300)	
	PTV1 +	3521/1629V	1TV, 1 radio	3/4	3(.333)	
	TARBS	3520/1630H	unknown	3/4	28(.062)	
TARBS/Th5	3480/1670H	6+ TV?	3/4	18(180)		
	Thai Global	3425/1725V	up to 7?	2/3	27(.500)	
InSat 2E/83	ETV mux	4005/1145V	6+ TV	3/4	27(.000)	
	DD2	3910/1240V	1	3/4	5(.000)	
	DD National	3830/1320V	1	3/4	5(.000)	
	Kairali TV	3699/1451V	1	3/4	3(.184)	
	Indian mux	3643/1507V	3	3/4	19(.532)	
	Jaya TV	3615/1535V	1	3/4	3(.255)	
	ETV Mux#2	3485/1665V	4+TV	3/4	27(.000)	
	ST1/88E	MMBN	3632/1518V	12TV	3/4	26(.667)
	As2/100.5E	Euro Bouqt	4000/1150H	6TV, 21r	3/4	28(.125)
		5-Star Med	3951/1199H	3TV	3/4	13(.185)
WorldNet		3880/1270H	4+/28radio	1/2	20(.400)	
Hubei/HBT		3854/1296H	1	3/4	4(.418)	
Hunan/SRT		3847/1303H	1	3/4	4(.418)	
Guan./GDT		3840/1310H	1	3/4	4(.418)	
In. Mongolia		3828/1322H	2	3/4	8(.397)	
APTIN Asia		3799/1351Hz	1	3/4	5(.632)	
Reuters/Sing.		3775/1375H	1	3/4	5(.631)	
Liaonin/Svc2		3734/1416H	1	3/4	4(.418)	
Jiangx./JXT	3727/1423H	1	3/4	4(.418)		
Fujian/SET	3720/1430H	1	3/4	4(.418)		
Hubei TV	3713/1437H	1	3/4	4(.418)		
Henan/Main	3706/1444H	1	3/4	4(.418)		
Egypt/Nilesat	3640/1510H	7+, radio	3/4	27(.850)		
As2/100.5E	Macau MUX	4148/1002V	5TV	3/4	11(.850)	
	Feeds	4086/1064V	1	3/4	5(.632)	
	Dubai MUX	4020/11430V	4+, radio	3/4	27(.500)	
	Jilin Sat TV	3875/1275V	1	3/4	4(.418)	
	HeiLongJian	3834/1316V	1	3/4	4(.418)	
	JSTV	3827/1323V	1	3/4	4(.418)	
	Anhui TV	3820/1330V	1	3/4	4(.418)	
	ShaanxiQQ	3813/1337V	1	3/4	4(.418)	
	Guan./GXTV	3806/1344V	1	3/4	4(.418)	
	Fashion TV	3795/1355V	1	3/4	2(.533)	
Modelflat	3792/1358V	1	3/4	2(.730)		
Myawady	3766/1384V	1	7/8	5(.080)		
Saudi TV1	3660/1490V	5+/tests	3/4	27(.500)		
As3S/105.5E	Telstra I-Net	12.596H	no TV	5/6	30(.000)	
	Zee bouquet	3700/1450V	10TV	3/4	27(.500)	
	Macau MUX	3713/1437H	2TV	3/4	5(.868)	
	Arirang TV	3755/1395V	1	7/8	4(.418)	
	Now TV +	3760/1390H	up to 8TV	7/8	26(.000)	
	Star TV	3780/1370V	15(+TV)	3/4	28(.100)	
	Star TV	3860/1290V	21(+TV)	3/4	27(.500)	
	Star TV	3880/1270H	20(+TV)	7/8	26(.850)	
	Indus Music	3900/1250V	2TV	7/8	27(.895)	
	Star TV	3940/1210V	7(+TV)	7/8	26(.850)	
CNNI	3960/1190H	8(+TV)	3/4	27(.500)		
StarTV	3980/1170V	12+TV	3/4	28(.100)		
Star TV	4000/1150H	9(+TV)	7/8	26(.850)		
Sun TV	4095/1055H	1	3/4	5(.554)		
CCTV bqt	4129/1021H	4(+TV)	3/4	13(.240)		
Zee Bqt #2	4140/1010V	8(+TV)	3/4	22(.000)		
Cak1/107.5	Indovision	2.536, 2.566, (S-band) 2.596, 2.626	33(+TV)	7/8	20(.000)	
	IndoBqt	3460/1690H	up to 6	3/4	28(.000)	
T'Kom/108E	TPI	4185/965V	1	3/4	6(.700)	
C2M/113E	Anteve	4144/1006V	1	3/4	6(.510)	

Receivers and Errata

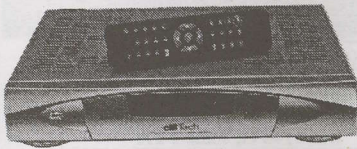
Finally settled here from As2
erratic service
Now essentially all CA
USA religion chs, CMM music FTA
possibly TARBS?
FTA + CA mux
3 Angels USA, Ch of Hope, + 9 radio
PIDs 4132/4133
frequency change
MUX testing
TARBS labell, CA-no SIDs
FTA (reaches SE Australia)
Several ETV now here; wide beam
SCPC, OK E. Aust. wide beam
SCPC, OK E. Aust. wide beam
SCPC, OK E. Aust wide beam
New (July 2002) Indian FTA mux
SCPC, OK E. Aust. wide beam
Several new ETV here; Asia beam
Nagravision, some FTA; erratic
FTA TV + radio
Macau MUX
FTA; Now here full time
FTA SCPC, teletext
FTA SCPC, teletext
FTA SCPC, radio APID 81
FTA: #1 Mongolian, #2 Mandarin
Sometimes FTA; also 3895Vt
FTA & CA
FTA SCPC, radio APID 256
FTA SCPC, teletext, radio APID 81
FTA SCPC, + radio APID 80
FTA SCPC, radio APID 80
FTA SCPC, + radio
Thru TARBS Aust, occ. FTA
5 chs TV, FTA
FTA SCPC feeds
FTA including sport
FTA SCPC, + radio
FTA SCPC
FTA SCPC, + radio
FTA SCPC + radio
FTA SCPC, radio APID 81
FTA SCPC, radio APID 257
Now Irdeto version 2 CA
Off air (new in June) in July
FTA SCPC - difficult to load
FTA MCPC
Signal useful for dish testing - no TV
Mediaguard (SECA) CA; 2 FTA
New June 2002; low res MUX
FTA SCPC; audio now OK
CA + NOW, Bloomberg, ATN FTA
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DV211, Zenith)
FTA PAL + occ. tests ch3
NDS CA as above
PowVu CA; new SR Apr 29
NDS CA (Pace DVS211, Zenith)
NDS CA w/ 4(Chinese) FTA
"History Channel" testing SCPC
moved from 4115
Mediaguard (SECA) CA
NDS CA using RCA/Thomson, Pace IRDs
also 3586H/17.500, 3496H/19.615
FTA SCPA; NT/NC only
change from 4055V; FTA SCPC

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	
(C2M)	Indo Mux	4080/1070H	5+ TV	3/4	28(.125)	
	Indosiar	4074/1076V	1	3/4	6(.500)	
	SCTV	4048/1102V	1	3/4	6(.618)	
	Indone.Mux	4000/1250H	6+TV	3/4	26(.085)	
	Satelindo	3935/1215H	1TV	3/4	6(.700)	
	Bali TV	3926/1224H	1TV	3/4	4(.208)	
	Indo. MUX	3880/1270H	3+ TV	3/4	28(.125)	
	Global MUX	3760/1390H	up to 12 TV?	3/4	26(.087)	
	Brunei/Sing	3733/1417H	1TV	3/4	6(.000)	
	RCTI	3473/1677H	2	3/4	8(.000)	
	Myawad TV	3706/1444H	1	3/4	5(.924)	
	Jc3/12	Miracle Net	3996/1154V	3 up to 6	5/6	22(.000)
		Asian bqt	3960/1190V	up to 8	7/8	30(.000)
	Jc2-8/54	BYU tests	3.915/1245V	1	3/4	3(.426)
	Meas2	Astro Mux	11.602H (+)	up to 10TV	3/4	41(.500)
3/156	Mediasat	12.336V/T2	5TV, 3 radio	2/3	30(.000)	
	Aurora	12.407V/T3		2/3	30(.000)	
	Aurora	12.532V/T5	Inc Zee TV	2/3	30(.000)	
	Aurora	12.595V/T6		3/4	30(.000)	
	Aurora	12.657V/T7	TV tests	2/3	30(.000)	
	Aurora	12.720V/T8		3/4	30(.000)	
	Austar	12.313H/T9	iTV + here	3/4	30(.000)	
	Austar/Optus	12.376H/T10		3/4	29(.473)	
	Austar/Foxtl	12.438H/T11		3/4	29(.473)	
	Austar/Foxtl	12.501H/T12		3/4	29(.473)	
	Austar/Foxtl	12.564H/T13		3/4	29(.473)	
	Austar/Foxtl	12.626H/T14		3/4	29(.473)	
	Austar/Foxtl	12.688H/T15	(some FTA ra)	3/4	29(.473)	
	B1/160	ABC NT fd	12.258V	1TV, 3 radio	3/4	5(.026)
		ABC feeds	12.317H	1	3/4	6(.980)
Net 7 service		12.397H	1	3/4	7(.200)	
Central 7		12.354H	1TV + 1 radio	3/4	3(.688)	
Imparja mx		12.360H	2TV + 8 radio	3/4	5(.424)	
Sport feeds		12.420V	1	3/4	6(.110)	
Mediasat#3		12.424H	3+ TV	2/3	19(.800)	
TVNZ DTH		12.456V	2TV	3/4	22(.500)	
Nine Net		12.512H	1 TV typ.	3/4	5(.632)	
Sky NZ		12.519/546V	7TV/7TV	3/4	22(.500)	
Sky NZ		12.581/608V	6TV/6TV	3/4	22(.500)	
Sky NZ		12.644/671V	9TV	3/4	22(.500)	
ABC HDTV		12.670H	5TV	7/8	14(.300)	
Tel/Saturn		12.707/733V	8+ TV	3/4	22(.500)	
P8/166		ABC A-P	12.301H	1TV, 2 radio	5/6	5(.858)
	TARBS3	12.326H	13TV + radio	3/4	28(.066)	
	TARBS	12.526H	13TV + radio	3/4	28(.066)	
	TARBS2	12.606H	13TV + radio	3/4	28(.066)	
	TARBS5	12.646H	testing	3/4	28(.066)	
	TARBS4	12.726H	13TV + radio	3/4	28(.066)	
	JEDI/TVB	12.686H	11+ TV	3/4	28(.126)	
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(.500)	
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(.125)	
	NHK Joho	4060/1090H	7TV, 1 radio	3/4	26(.470)	
	ESPN USA	4020/1130H	8+TV, data	7/8	26(.470)	
	Discovery	3980/1170H	8 typ.	3/4	27(.690)	
	CalBqt/Pas8	3940/1210H	up to 8TV	7/8	27(.690)	
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)	
	FilipinoMUX	3880/1270V	up to 8TV+radio	3/4	26(.694)	
TaiwanBqt	3860/1290H	12TV + 30 radio	5/6	28(.000)		
CCTV Mux	3839/1311H	up to 4	3/4	13(.240)		
EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(.632)		
CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)		
MTV	3740/1410H	8	2/3	27(.500)		
P2/169E	P2/169	12.281V	2+ TV, radio	2/3	27(.500)	
	WA PowVu	12.637(.5)V	4TV, 8 radio	1/2	18(.500)	
	TVR Mux	4026/1124V	up to 8	3/4	22(.000)	
	Fox Bouquet	3992/1158V	8TV/data	7/8	26(.470)	
	Feeds	3966/1184V	1	2/3	6(.620)	
	Feeds	3957/1193V	1	2/3	6(.620)	
	Feeds	3929/1221V	1	3/4	10(.850)	
	Feeds	3912/1238V	1	2/3	6(.620)	
	Feeds	3898/1252V	1	2/3	12(.000)	
	Middle East	3836/1314V	4 typ	3/4	13(.331)	
	Feeds	3803/1347V	1	3/4	6(.000)	
	BBC +	3743/1407V	3	3/4	21(.800)	

Receivers and Errata
Global TV - frequent changes in lineup
FTA; solid on 3.5m in New Caledonia
FTA SCPC; NT/NC only
unstable platform - testing?
Test card only reported
Testing June 2002
TVRI, others FTA
Testing- 12 chs promised
FTA; share time, Brunei-23hrs, Sing1h
FTA SCPC, Australia, NC OK
may be test; svc has been erratic
PowVu, some FTA (ch # 1,3)
CA & FTA NTSC: Japan, Taiwan
Testing late July - very strong Aust, NZ
Aust East beam - FTA + CA
FTA-TBN new 1 Aug; V1660, A1620
Aust, NZ 90 cm; CA (*); ABC Nat
cvrs Aust, NZ 90 cm; CA (*)
Aust only; * - smart card p. 26
cvrs Aust, NZ 90cm (Optus FTA test)
Aust only; * - smart card p. 26
Austar Interactive + (data?)
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
V832, A833
also 12.326, 12.335; ex PAS8 Ku
Full schedule less commercials
VPID1280, APID 1281
V1024, A1025, P1024; also try 12.379
Weekend footy feeds reported-FTA
FTA 2 channels; more unlikely!
testing digital feeds; Sr may be incorrect
NDS CA, subscription available NZ
NDS CA, subscription available NZ
NDS CA, subscription available NZ
also 12.603, 626, 643, 688, & 706H
NDS, Wellington uplink
Feed, Adelaide; not permanent
TPG/EurodecMDS CA, occ. FTA
TPG/Eurodec MDSCA, radio FTA
TPG/Eurodec MDS CA; TRT FTA
TPG/Eurodec MDS CA
TPG/Eurdec MDS CA; Thai TV, FTA
June 2002-Irdeto-2 CA
Dateline west; east PAS2, 3901
PowVu CA
PowVu CA & FTA; subscription avail
PowVu CA; ch 11 DCP-CCP bootload
PowVu/CA (some audio FTA)
PowVu CA & FTA (EWTN)
FTA at this time
Myx FTA V1960, A1920 + radio FTA
currently FTA; radio may require PIDs
PowVu FTA, replaces PAS-2 svc
was As2; PowVu CA
PowVu, CNN/CNNI now CA
#2, 8 MTV China FTA; rest CA
PowVu CA, WIN, ABC NT
PowVu CA, WA only - D9234
CA feeds to pay-TV; #7 TVBS-N FTA
Pv, CA/FTA (FTA ch3 test card
PowVu (FTA) occ feeds
PowVu (FTA) occ. feeds
PowVu (FTA) occ sport feeds
PowVu(FTA) occ. feeds
PowVu (FTA) occ. feeds
RAI TV, radio FTA; balance CA
PowVu (FTA) occ sport feeds
BBC FTA, others CA usually

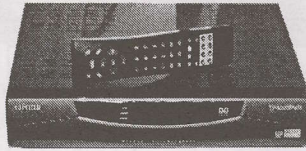
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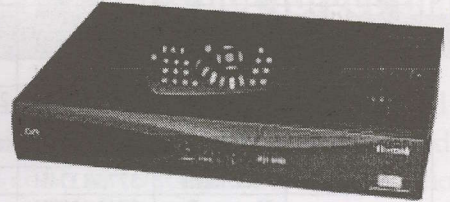
eM200 FTA + 2 CI Slots \$A400
eM300 FTA+2CI+40G PVR \$817

TOPFIELD



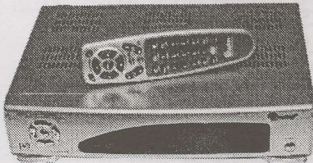
TF3000CIP
FTA+2CI+Positioner \$A490
TF4000PVR
FTA+2CI+40G PVR with
twin tuners \$A999

HUMAX

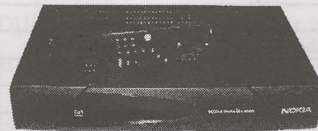


IRC15400Z embedded irdeto + 2 CI slots \$A635
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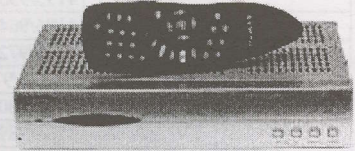
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201SA Aston embedded- suitable
for Mediaguard/Seca \$A500



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Irdeto Cam & SCSI port \$A1400



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digital model - no card slots \$A299

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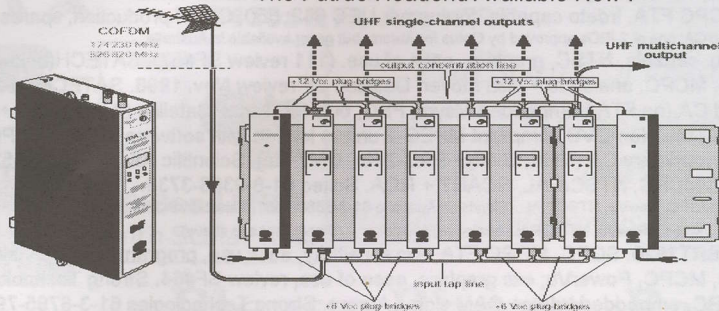
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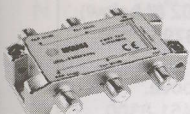
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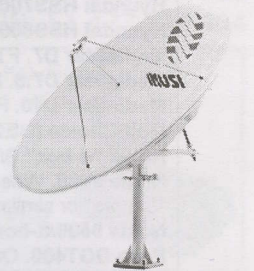
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Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS-2/169)	Feeds	4040/1010H	1	3/4	10(.850)
	7thDayAdv.	3872/1278H	1	3/4	6(.620)
	Feeds	3868/1182H	1	2/3	6(.620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)
	HK bouquet	3850/1300H	up to 8	2/3	24(900)
	occ feeds	3776/1374H	1 typ	3/4	5(.560)
	Korean Bqt	3762/1388H	up to 3	3/4	11(.570)
I702/176E	RFO Poly	4027/1123L	1TV	3/4	4(.566)
I701/180E	TNTV	11.060&11.514	9	3/4	30(.000)
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(.000)
	TVNZ	4195/955RHC	1	3/4	5(.632)
	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)
	TVNZ	4178/972RHC	1	3/4	5(.632)
	AFRTS/radio	4175/975L	3 radio	2/3	3(.680)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(.632)
	TVNZ/feeds	4161/989RHC	1	3/4	5(.632)
	RFO-Canal+	4086/1064L	4TV, radio	5/6	12(.041)
	TVNZ/feeds	4052/1098RHC	1	3/4	5(.632)
	TVNZ feeds	4044/1106R	1	3/4	5(.632)
	NZ Prime TV	4024/1126L	1	2/3	6(.876)
	NBC to 7 Oz	3960/1190R	1	7/8	6(.447)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(.000)
	Ioarana	3772/1378L	1	3/4	4(.566)
	TVNZ	3846/1304R	1	3/4	5(.632)
	10 Australia	3769/1381R	4	7/8	20(.000)
	USA feeds	3749/1401R	4?	?	26(400)

Receivers and Errata
PowVu occ FTA feeds
Sat, Sun 0030, 0900+UTC ? need verif)
FTA (occ sport); also try 3863, Sr6.100
FTA-typ NTSC-occ sport, live Shuttle
PowVu CA + FTA (BBC gone)
was 4148Vt; some FTA
occ feeds, typ FTA; also Sr 5.600
Korean MUX, reload June 01
SE spot beam
cast spot; 10TV + r each, vertical pol.
3 FTA, Mediaguard; also 10.975
DMV/NIL early version, occ feds, typ ca
DMV/NIL early version, occ feds, typ ca
DMV/NIL early version, occ feds, typ ca
'DTS' radio is FTA some revrs (TV CA)
DMV/NIL early version, occ feds, typ ca
DMV/NIL early version, occ feds, typ ca
east hemi 20.5 dBw thru 2003+; new Sr
DMV/NIL early version, occ feeds, typ ca
SCPC, mixed CA and FTA feeds
PowVu CA; Auckland net feeds
CA, Leitch encoded
New Feb 2002; vert strong NZ, Pacific
FTA SCPC; East Hemi Beam-Tahiti
SCPC, mixed CA & FTA, feeds
PowVu CA & FTA; #3 TBN
16-QAM (not MPEG-2 compatible)

MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. Av-COMM Pty Ltd, 61-2-9939-4377.

AV-COMM R3100(A). FTA, good sensitivity, ease of use exc (review SF May 2002). See above contact.

Benjamin DB6600-CL. FTA, Foxtel/Austar w/CAM+card. Autosat Pty Ltd 61-2-9642-0266 (review SF#72)

eMTech eM-100B (FTA), eM-200B (FTA + Clx2), eM210B (FTA + 2xCl + positioner); KanSat 61-7-5484 6246 (review SF#89)

Humax F1-Cl. Primarily sold for TRT (Australia), does (limited) PowerVu (not Optus Aurora approved).

Humax ICRI 5400. Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available, review SF#76.

Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good. SATECH (V2.26)

Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.

Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.

MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. Int. 61-2-9618-5777

MediaStar D7.5. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777

MediaStar D10. FTA and Irdeto embedded CA. VG receiver; see review SF#96, AUGUST 2002. Contacts immediately above.

MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738

Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. See SF#95, p. 14.

Nokia 9200. When equipped with proper software, does Aurora, pay-TV services provided software has been "patched" with "Sandra" or similar program. See SF#95, p. 14. SatWorld 61-3-9773-9270 (www.satworld.com.au)

Nokia 9500/d-box: SatWorld, 61-3-9773-9270 (www.satworld.com.au)

Pace DGT400. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818)

Pace DVR600. Original DGT400 modified for NBC (PAS-2)/RSA use, with CAM equivalent to DGT400 but more reliable.

Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version.

Panasat 520/630/635. MCPC FTA, Irdeto capable, forerunner UEC 642, 660. Out of production, spares fax ++27-31-593-370.

Panasonic TU-DS10. FTA + Irdeto CA; one of 2 IRDs approved by Optus for Aurora, but never available in Australia.

Phoenix 111, 222. PowVu capable, NTSC, MCPC, graphics, ease of use. (111 review SF#57). SATECH(below)- 222 out of production

Phoenix 333. FTA SCPC, MCPC, analogue + dish mover. Detailed SF review Nov. 1998. SATECH 61-3-9553-3399.

Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)

PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, GWN+ PAS-2 Ku, CMT etc). Scientific Atlanta 61-2-9452-3388.

Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.

SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-3749)

SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above).

STRONG Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review March 2002 (# below).

Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Technologies 61-3-8795-7990.

Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, Aurora. Strong Technologies 61-3-8795-7990.

Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84); Strong Technologies, # above.

UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.

UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel-limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.

UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers.

Winersat DigiBox 200. C + Ku basic receiver but includes Teletext for NZ TVOne, 2 VBI. Satlink NZ, fx 64-9-814-9447.

Xanadu. DVB compliant special-priced receiver for members of SPACE Pacific (Av-comm Pty Ltd, tel +61-2-9939-4377)

Accessories:

Aurora smart cards. New v1.6 now available, 1.2 no longer available for RABS. Price now A\$105, Sciteq 61-8-9306-3738.

PowerVu Software Upgrade: PAS-8 4020/1130Hz Sr 26 470 7/8' nam ch 11 and follow instructions (do not leave early!)

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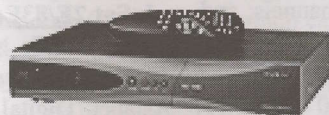
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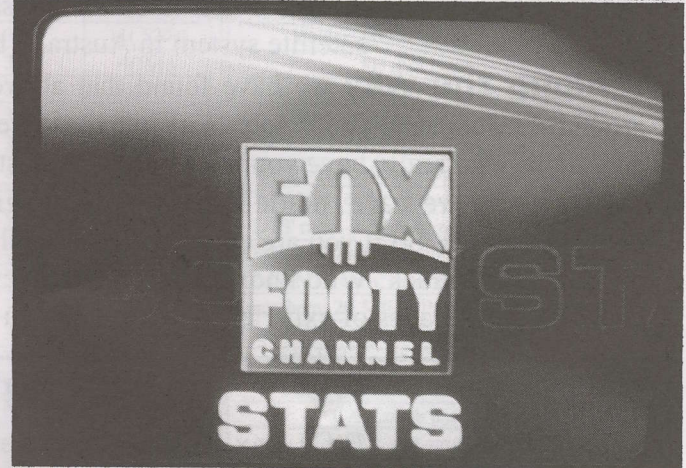
WITH THE OBSERVERS

AT PRESS DEADLINE

TBN is on C2M 3720Hz, Sr 12.500, 3/4 - an "Asian" beam. In next two weeks, they will move to an MCPC package and are considering requesting NZ-Beam coverage so as to reach eastern Pacific. ABC's NT feed 12.258Vt (Sr 5.026, 3/4) dropped 10 dB around 1 August - not first time. Austar has switched off ABC subtitles; on ADB, "TT" button now accesses new T-Mail service.

AsiaSat 2/100.5E: "ModelFlat, 3792, Sr 2.733, 3/4 apparently has gone away." (IF, Queensland)

AsiaSat 3S/105.5E: "There are programmes with English audio on Ekushey World/ETV 3949Vt, Sr 3.418, 2/3." (AN, NSW) "Telstra's new Internet to the Bush service testing on Ku 12.596Hz, Sr 30.000, 5/6." (AN, NSW) "Holding a 60cm dish in my hand, eMTech 100 indicates 80% signal quality on this service." (D. Mitchell, NSW) "ATN World testing 3760Hz, VPID 2040, APID1041; this is the NOW-TV mux." (Raj, PNG) "Channel line-up on NOW-TV bouquet currently as follows: (1) "NOW TV (FTA NTSC), (2) Bloomberg TV (FTA PAL), (3) Test card for UM Network (PCM TSG1), (4) ATN World (FTA PAL), (5) Repeat of channel 3 (test card), (6) Tech TV (PowerVu CA), [no channel 7], (8) TAS TV (CA) and (8) Tests labelled 'DBN24 for TS1.'" (FS, NSW) "Bharathi (ch 5) and Kaveri (ch 6) on 3700Vt, Sr 27.500, 3/4 no longer transmitting programming but channel is 'hot' with data stream (minus modulation). What now loads (on a Hyundai) is (1) Zee English, (2) Zee International, (3) Zee Movies, (4) Test 2, (5) Bharathi (FTA but no programming), (6) Kaveri (FTA but no programming), (7) Zee Cinema, (8) ZeeTV, (9) Nickelodeon and (10) ZEE ED. When loaded on a Nokia with factory programming, slightly different displays. On Zee's 4120Vt, Sr 22.000, 3/4 the Nokia loads (11) Zee Music, (12) Zee News, (13) Alpha Punjabi, (14) Alpha Gujarati, (15) Alpha Bangla, (16) Alpha Marathi, (17) Test 3 and (18) Test 4." (AN, NSW) "Star TV has done a perhaps major channel reshuffle and the 'totals' are now as follows: 3780Vt (Sr 28.100, 3/4) 15 (CA) TV channels; 3860Vt (Sr 27.500, 3/4) 21 (CA) TV channels; 3880Hz (Sr 26.850, 7/8) 20 (CA) TV channels; 3940Vt (Sr26.850, 7/8) 7 (CA) TV channels; 3980Vt, Sr 28.100, 3/4) 12 (CA) TV channels; and, 4000Hz (Sr 28.650, 7/8) 9 TV channels of which 4 are FTA (all Mandarin)." (AN, NSW) "Macau mux on 3713Hz - a stock Nokia 9200 won't load but a Hyundai 100 loads (1) Macau FTA terrestrial TV and (2) an unnamed, not in use FTA (?) channel." (IF, Qld) "Arirang TV 3755Vt, Sr 4.418, 7/8 seems to have solid audio now - perhaps you should remove warning in Digital Watch?" (NS, NSW) "Indus Music Bouquet 3900Vt, Sr 27.895, 7/8 current channel list: (1) CH - 22 Indus Vision" and (2) "CH - 23 Indus Music" both FTA PAL. Digital Watch incorrect stating there are "up to 5 TV channels here." (FS, NSW) "CNNI 3960Hz, (new) Sr 27.500, 3/4) strangely loads on Nokia (unusual for PowerVu CA) with



BETTING the farm. Foxtel (and Austar) have hoped (against hope) that the new regionalised "Footy Channel" would turn the tide and grow their subscription base. Alas, Foxtel reported A\$100 million loss in most recent financial period and Austar is down to "reserve" funds (p. 2).

following list: (1) CNNI, (2) Cartoon Asia, (3) Newsource DNEW, (4) Cartoon Taiwan, (5) Cartoon Macau, (6) Cartoon Philippines, (7) Cartoon Australia and (8) TCM Australia." (IF, Qld) "Old fashioned analogue notes: Asia Plus 3640Hz has stereo audio with left 5.55, right 6.20; Star Sports on 3800Hz (English) is stereo left 5.94, right 6.20; [V] Asia 3840Hz has left 5.55, right 6.20; Phoenix 3920Hz has left 5.55, right 6.20. Also Pakistan TV at 4140Vt has a radio service (7.50) but apparently not 24 hour." (HE, NSW)

InSat 2E/83E: "The SCPC on 3683Vt is gone, as is 3693Vt. These SCPCs have moved to a new MCPC on 3643Vt, Sr 19.5312, 3/4 with (1) Asianet Global (FTA, Indian), (2) Asianet Digital (FTA, Indian), (3) Jeevan (a new Indian service). This must be on 'wide beam' because it plays fine on a 1.8m in NSW." (D. Mitchell, NSW)

Intelsat 604/157E: Satellite has drifted to this resting spot, could be activated on C and spot-beam Ku as early as late-August; reports encouraged! This is an inclined orbit bird, scheduled for replacement (705) mid December 2003.

Intelsat 701/180E: "My eMTech 100 plays American Forces Network audio bouquet (3 channels, SR 3.680, 2/3, 4175LHC) on 1.8m." (D. Mitchell, NSW)

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for September 15th issue: September 1 by mail or 5PM NZ September 3rd if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.

Towards a "Cam-Less" Society

Three letters of notification are circulating within the pay-TV community which are of interest to us as an industry. The first, undated but written early in July, is over the signature of Christine MAURY PANIS, VP and General Counsel for Viaccess Technology and Marc du PELOUX, IRD Sales and Licensing managing for the same firm. In part, it reads:

"We hereby notify all partners licensed under the VIACCESS technology that VIACCESS has terminated on July 1, 2002 its license agreement with Korean manufacturer Humax due to constant and numerous breaches to its license obligations, such breaches having seriously harmed VIACCESS licensed operators, manufacturers and distributors."

In a separate (July 29) letter, addressed to Martin Kaufmann of SCM Microsystems GmbH and dated July 29th, Ole Hansvold who is Chief Operating Officer of Conax AS (an encryption system provider) wrote:

"Conax AS itself is currently the only authorised provider of Common Interface modules compatible with the Conax AS conditional access systems. Conax AS has not licensed any (other) party to provide Common Interface modules."

A third letter dated July 24 over the signature of Daniel Thunberg, Account Manager STB for Irdeto Access, also to SCM Microsystems' Martin Kaufman, reads in part:

"SCM Microsystems is currently the only licensed manufacturer of Irdeto Access Common Interface modules. The manufacture, distribution, or sale of Common Interface CAMs that are compatible with Irdeto Access CA systems by any other parties other than SCM ... is an abuse of the intellectual property rights of Irdeto Access that may have legal consequences."

We asked Rolf Deubel to comment on these recent disclosures.

"The manufacturer's panic can clearly be read between the lines. They realise that their 'fantastic license to print money' is slowly breaking apart. You do not need a 'licensed' XYZ CI module to decrypt CAS protected pay-TV content! Well - what does that mean? Simple and easy. Developers and manufacturers of 'universal' CI CAMs have clearly shown that the 'secrets' of the (original) encryption system are actually NOT needed to decrypt protected content, if one follows simple DVB standard rules and tells the unit 'where' to look for 'what' to decrypt!

"Let me put this another way: A CI module does NOT use the same algo as the smartcard; the smartcard is - with the universal CI - still needed to decrypt the data stream (unlike the highly threatening so called 'FreeCAMs' where no smartcard is needed at all). This means that the CI more or less just identifies which CAS is used and transfers this info to the smartcard. This info consists of CA ID word (Conditional Access Identifier word - a word in computer language is 2 Bytes) e.g. 0600 for IRDETO or 1800 for NagraVision and even MDS (used by TARBS) has a CA ID which is 2500. Furthermore, the PMC needs to be identified where the PMC is the ECM PID. That's more or less it! Once this information is known, the smartcard can do the rest!

"Or - yet another way: Contrary to popular belief (and contrary to what some people want to make you believe) the CAM is not a relevant component in a well designed Conditional Access system. All it does (with relevance to the CA implementation) is filter the appropriate messages from the ECM and EMM datastreams, based upon a set of parameters provided by the card during the initialisation procedure, and send them to said card. If the subscriber is authorised (authorisation is performed by evaluation of the EMMs) the card will return the currently valid control word to the CAM upon reception of an ECM. The CAM in turn will feed this control word as a key to the CSA descrambler, which performs the actual descrambling / decryption of the MPEG data streams -- end of story for the involvement of the CI / CAM. So, as long as the framing of the messages (ECM/EMM) in question are left unchanged, the payload can be changed at will without the need for new CA equipment at the point of reception. That's why Irdeto2 works on the oldest PACE (DGT) 4/500 equipment in South Africa. The impression that these '2' versions are actually new systems is completely off the mark. They are 'just' new cards -- but since the point in smartcard based CA systems is that the card is the only relevant piece of cryptographic equipment at the point of reception, that will easily suffice in rendering screens black.

"Now... any Tom, Dick or Harry can have his own CI developed which can identify and answer - and nothing else is done in a CI - smartcard requests! What the guys from the CAS companies are trying to say is, that you can not work with house numbers (PMC) and street names (CA ID) because they have licensed them for *their own* city. This is a joke and has nothing to do with the CAS itself where the 'secrets' are in the smartcard and the way the algo is applied to the stream by the smartcard."

And this further Rolf Deubel provided "translation" of a news report appearing in Germany.

"In a police action raid on Friday 02.08.2002 a Spanish citizen has been arrested in Hamburg after selling more than 3,000 D-Box2 (which have been embezzled from German Pay-Tv provider "Premiere") on various Internet auctions. When his premises were searched, police found more than 10,000 Premiere smartcards and more importantly lists with names and addresses of people who bought the stolen goods from the Spanish man. In a second police action in Munich at the same time an Italian citizen was arrested who supplied the D-Boxes to the man in Hamburg. +/- 110,000 Euro in cash was also seized during the search. The D-Box2, which is not freely available for digital satellite viewing, was developed by German BetaResearch and manufactured for Premiere by NOKIA of Finland, SAGEM of France and Dutch manufacturer Philips exclusively for Premiere at a price of 599 Euro each. Premiere offered the box to potential new clients in conjunction with a new 6 month subscription for 299 Euro or 7.50 Euro monthly rent hoping the new client would like the service and extend the contract. The seized boxes were mainly boxes (originally) taken on a rental basis for 7.50 Euro but never returned to the legal owner Premiere. Investigations are going on to get the illegally auctioned boxed back to the legal owner Premiere

"The D-Box2 has become famous because it is the first satellite box able to be modified to operate with 'Open Source' operating system LINUX and has promptly been accepted by German Hackers to be modified to work under LINUX without a smartcard. SatFACTS will detail in its October issue how the German press openly reported about 'How Premiere and the D-Box2 are hacked' to watch Pay-Tv without paying; in the December issue SatFACTS will then bring a "Big D-Box2 report" on hardware and LINUX as an operating system for a satellite STB (SetTopBox).

JcSat2-8/154E: Brief flurry of excitement as a test feed originating at Utah's BYU-TV appeared here (3915Vt, Sr 3.426, 3/4) for around ten days late in July. Signal variously reported as, "strongest C-band ever seen," when operating (unmodulated carrier still there August 5) with 80cm able to lock & load in Perth. Now that's strong! On the other hand, some Hyundai IRDs would not load it at all.

Optus B1/156E: "Net 7 correct frequency is 12.397Hz, mostly transmitting ATN-7 Sydney. Net 9 parameters given

THE SATFACTS PARTS STORE

- d-BOX 1:** 2MB RAM chip (see p. 15, SF#96) US\$25
d-BOX 1: 1MB 29F800 Flash (see p. 15, SF#95) US\$29
d-BOX 1: AC3 Dolby extension kit for digital audio output (see future issue SF) US\$39
d-BOX 1: Pre-programmed AMON 4.1 27C512 EPROM inc. PLCC socket. US\$39
Humax 5400Z: 45 pin Molex socket for patching bootloader (see future issue SF) US\$24

How to order:

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- 3) Fax to ++64-9-406-1083 (maximum security) or Email with subject line "Parts" to skyking@clear.net.nz or mail information to "Parts, SatFACTS, PO Box 330, Mangonui, Far North, New Zealand." Shipment via airmail, next day shipment except when back ordered! Airmail postage will be added on top of merchandise amount.

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(12.512Hz, Sr 5.632, 3/4) will not load although strong signal present. ABC HDTV Sr 14.300, 7/8 now operating 12.603Hz, 12.626Hz, 12.643Hz, 12.670Hz, 12.688Hz and 12.706Hz..

Optus B3/160E: "TBN from USA has joined Mediasat/ Globecast bouquet (channel 6), VPID 1660, APID 1620." (S. Myers, NZ)

Palapa C2M/113E: "TV5 analogue 4160Hz has programme audio now on 6.60, plus radio service 7.20. Indonesian MUX is correctly 4000/1150Hz as follows: (1) Channel News Asia (FTA PAL), (2) Q-Channel (FTA PAL), (3) SWARA (FTA PAL), (4)/(5)/(6) FTA test cards." (FS, NSW) "RCTI 3473Hz, Sr 8.000, 3/4 loads as two programme channels: (1) rcti (FTA PAL) and (2) rcti2 (FTA PAL)." (IF, Qld.)

PanAmSat PAS2/169E: "TVB Mux, 4026Vt, Sr 22.000, 3/4 now has 8 TV channels (previously 6) of which #7 remains FTA (TVBS-N USA)." (IF, Queensland) "Fox Bouquet 3992Vt, Sr 26.470, 7/8 only has channel 3 - typically NTSC test card - FTA; channel 5's Fox News USA is CA." (NS, NSW)

PanAmSat PAS8/166.5E: "NIME World testing 4060Hz (NHK bouquet), FTA, Sr 26.470, 3/4." (Andrew, Qld) "ESPN FTA for a week, now back CA with new numbers: 4020Hz, Sr 26.470, 3/4 as (1) Brazil, (2) ESPN2, (3) ESPN, (4) Latin "A", (5) Latin "B", (6) Atlantic, (7) Pac Rim and (8) Syndication NTSC." (D. Mitchell, NSW). "Filipino mux (3880Vt, Sr 28.694, 3/4) may have increased power - can now load for first time. MYX (channel) is FTA, Nokia loads 26 services, many radio." (B. Oliver, Victoria) "NHK Bouquet should be listed as 4060Hz, Sr 26.470, 3/4." (IF, Qld)

Thaicom 3/78.5E: "IRIB3 has replaced test card on 3640Hz, Sr 28.064, 3/4; VPID 523, APID 641." (B. Richards)

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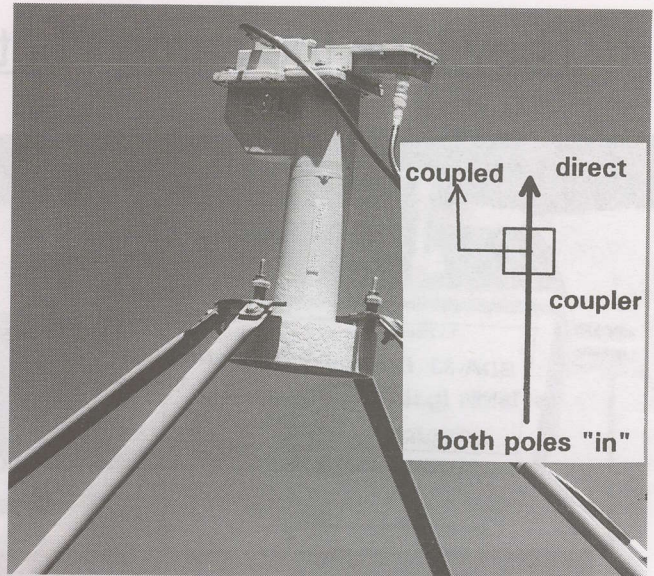
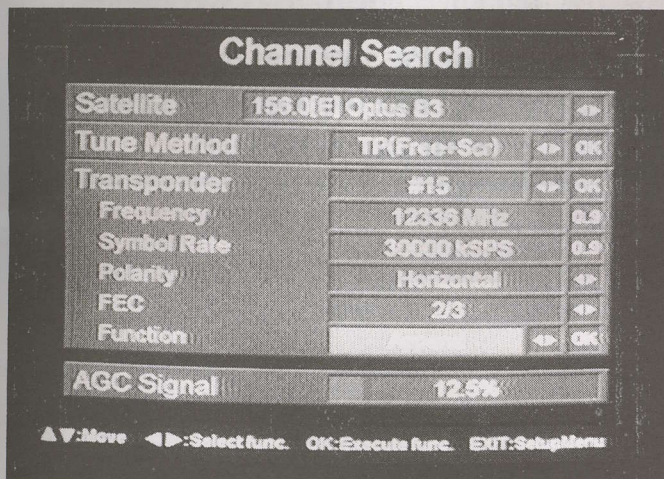
Polarity Addendum

Back in the analogue days, you knew you had cross pole interference because the transponder you were peaking was degraded even when the signal was strong enough to have been "clean." Analogue cross-pole usually manifests as sparklies - a signal registering 12 dB C/NR should *not* have sparklies. On occasion, the cross pole produced sparklies and some weird herringbone lines that pulsed or "modulated" while the PLL (demodulator) attempted to "track" the unwanted information.

Digital cross-pole most frequently appears as a locking of the desired image when you *know* there is enough signal present to have flawless video. It may also appear as random pixelations, often attacking only a small segment of the screen (such as a rectangle in mid-screen). As the drawing on p. 7 illustrates, whether you are adjusting a dual-polarity (ortho-mode) signal divider or a simplistic LNB(f), the mechanical "width" of the null adjustment is but a tiny fraction of the very broad "peak" on the maximum signal adjustment. In other words, if you only adjust for *peak* signal, you can be sloppily off by 0.1 to 1.5 dB from peak signal and cover a mechanical adjustment window of perhaps between 6.30PM and nearly 8.30PM on a clock face. There is no mystery why our twin photos (p. 8, this issue) of Sky NZ installations show such a variety of LNB(f) "settings" - after a few dozen installs the installer no longer "bothers" to check for peak signal; he simply cranks the LNB(f) to the position where he has been told the maximum signal exists (such as "the 8 o'clock spot") and tightens up the hardware.

This is acceptable not because it is correct, or skilful but only because for New Zealand on Optus B1, there is no meaningful horizontal polarity signal level which might create interference. Or perhaps, it is *not* acceptable.

ONE "trick" is to set up on the pole you do not want and monitor the signal level ("AGC signal" on this Strong 2620) from a robust signal on the opposite polarity. When no SpecAn is available, this is the next best measurement approach.



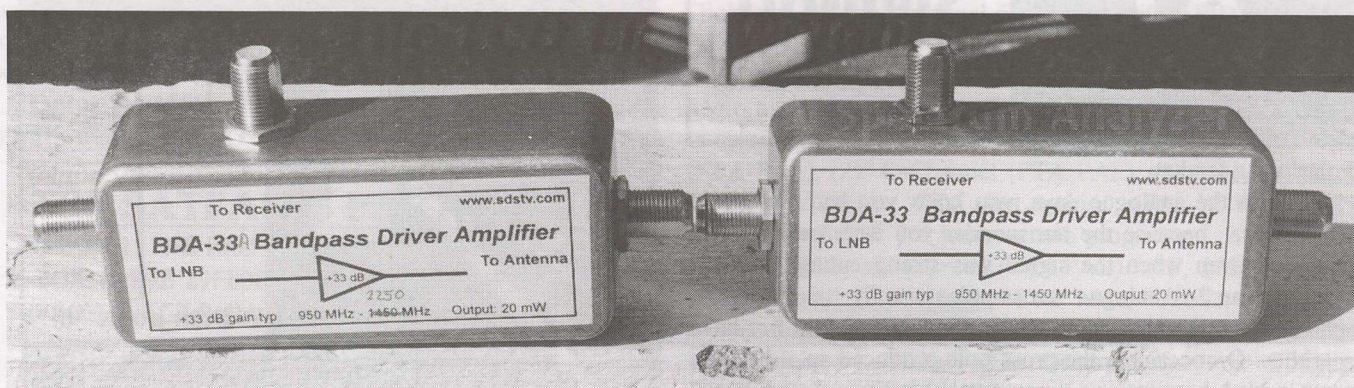
YOU can "see" the logic in most C-band ortho-mode couplers. The signals come in through the feed scalar system, "down" (up in this photo) the "throat" (waveguide tube) and "straight through," directly in a straight line, to the (Chaparral) LNB at the top. Likewise, the "coupled" port is tacked onto the side off to the left.

Recent letters appearing in major NZ newspapers and news articles have highlighted that because Sky NZ has elected 60cm size dishes for a major portion of the country, rain "fades" (loss of signal created by degradation when it rains hard) have now become a major source of customer irritation.

Sky has been defending their commercial decision not to use a slightly larger dish (72cm was their next plateau) because, they claim, "*people would not want the larger dish on their house.*" It is very unlikely people were ever given that choice - a 72cm with 1 dB more rain fade protection over a 60cm. It is equally unlikely that an installer "pointing" the LNB(f) at 6PM or 9PM is giving the home the best signal possible. We ran a 60cm dish through the paces with the LNB(f) at every half-hour setting between 6PM and 9PM and found as much as 1.5 dB signal loss at the extremes. That is the difference between 60cm and 80cm.

Peter Lacey suggests the installers doing sloppy installs are not equipped with adequate test equipment, or knowledge. He backs up his belief by pointing at installs he has checked after the installer had left the job. We tried the same approach here in northern NZ and found we could always - *every time* out of ten we tested on - find *at least* 0.5 dB more signal above the level present when we plugged in. The average was 1.1 dB more *after* we tweaked - which is a very big number when it comes to protecting against rain "fades." If installers were sent back to correct their mistakes at their own expense, they would make fewer. And if installers don't possess a suitable meter to do it right the first time, perhaps they should not be installers. If I was in charge, installers who failed to hit within 0.5 dB of maximum signal on installs would forfeit 50% of their installation fee. Those falling between 0.5 and 1.5 would lose 75% of the fee. Anything over 1.5 dB would be 100% forfeiture. Should they fall over 1.0 dB on 60% of installs checked, to probational status for 30 days (losing their job if things didn't improve dramatically). And that would put a big dent in subscriber complaints. *Fast.*

They look the same - but they don't work the same!



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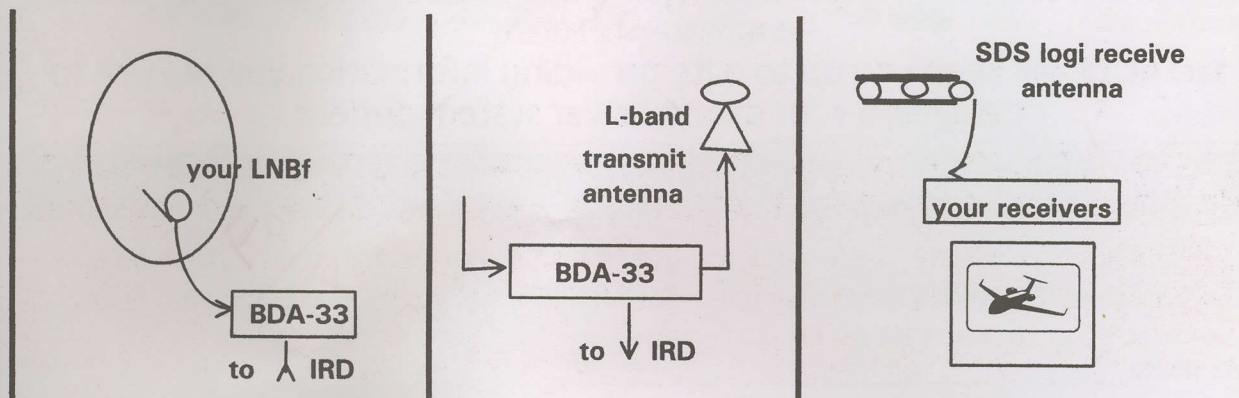
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HOW does the BDA work?

*It is a
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The BDA-33 is inserted into the coaxial line presently connecting your satellite receiver / IRD to the LNB(f). The BDA-33 can insert into this line at any point - simply cut the RG6, install two new "F" fittings and plug it in (left). The remaining (third) BDA-33 connector goes to the SDS L-band transmit antenna - a 360 degree coverage "Discone" or a 60 degree coverage "Passive Logi" - depending upon your coverage needs (middle). Power for the BDA-33A is supplied by the satellite receiver / IRD which continues to also supply power to your LNB(f).

The BDA-33 is a "Bandpass Driver Amplifier" or "Linear Translator." It samples the full L-band signals coming from the LNB(f), removing just enough signal from the LNB(f) to "drive" a powerful in-built L-band amplifier. This amplified L-band product, the same frequencies as the LNB(f) created and each signal in its original format (i.e., analogue stays analogue, digital remains digital), is then broadcast through the air using the SDS L-band transmit antenna. FTA signals remain unaltered FTA, CA signals remain unaltered CA.

With the signal "in the air" through the SDS transmit antenna, all you need to receive the full range of L-band signals produced by the LNB(f) is a SDS L-band receiving antenna and one (or more) standard satellite receivers (right hand diagram). This is the "shared dish system" concept - one dish producing L-band signals through a LNB(f), resent through the air to other receivers. It is "wireless" sharing of services - and with appropriate system planning will provide LOS (line of sight) coverage over path lengths to several kilometres or non-LOS coverage through walls and vegetation over several hundred metres.

NOTE: The BDA-33 creates no new signals. It only amplifies (after appropriate filtering) signals already present inside of your LNB(f) RG6 coaxial cable "down line."

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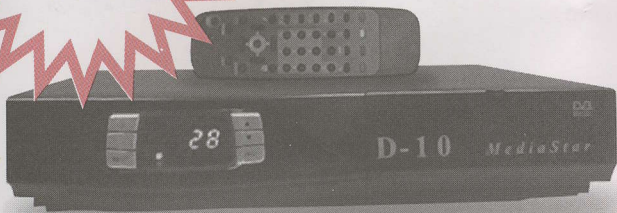
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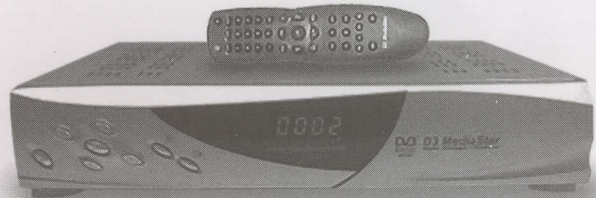
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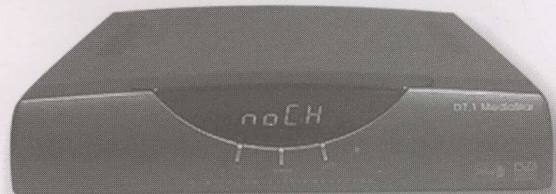
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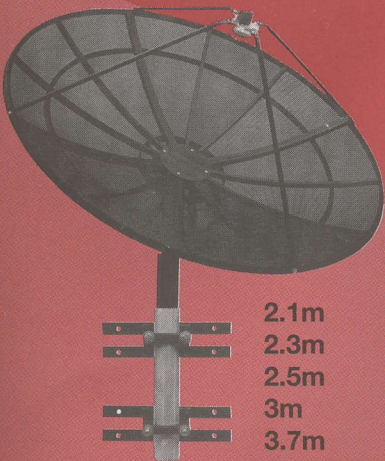
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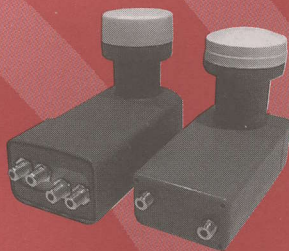


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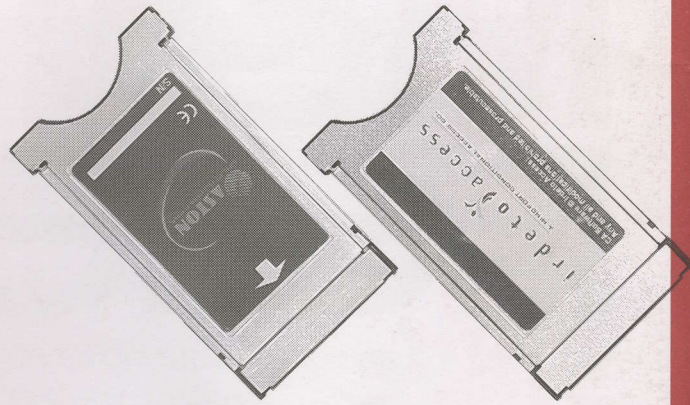
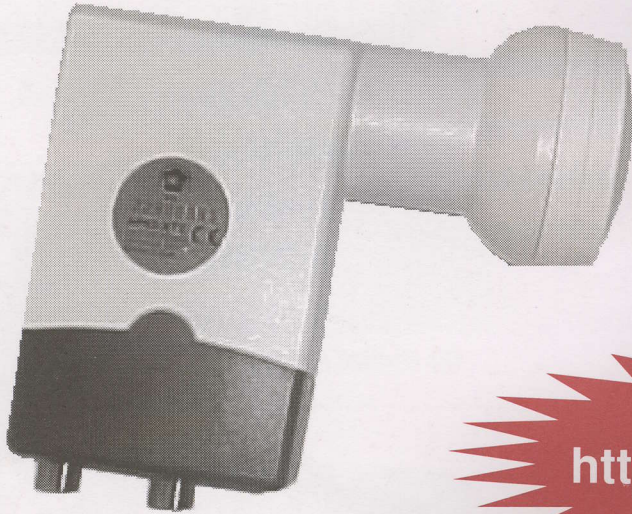


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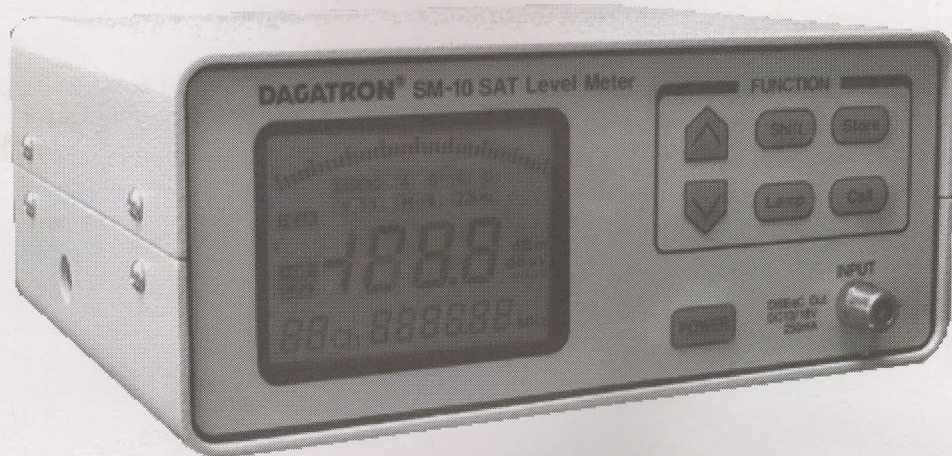
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