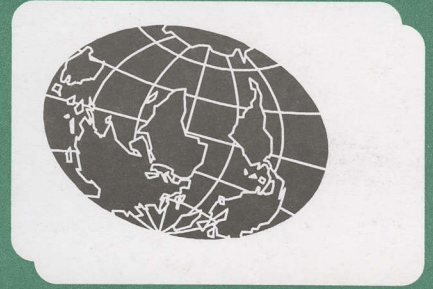


July 10 - 9AM

Bob Cooper's

JULY 15 1999

SatFACTS



MONTHLY

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

IN THIS ISSUE

**Putting the Cap
on Piracy
Cards**

**Smart card splitters
and card doublers
raise the stakes**

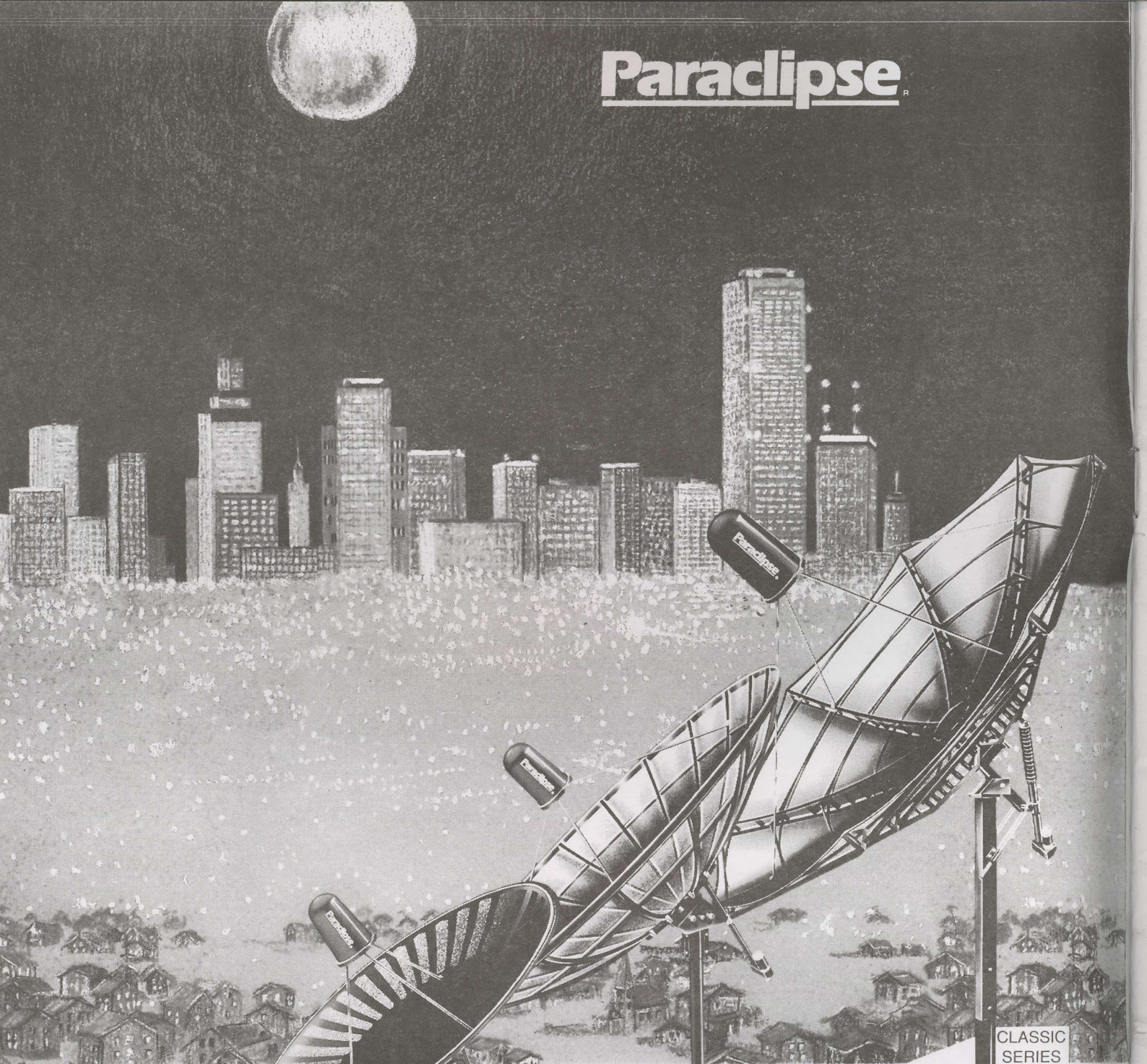
**ABA changes rules;
Growing to
Internet**

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- ✓ Latest Hardware News
- ✓ Latest SPACE Pacific Reports
- ✓ Cable TV Connection

Vol. 5 ♦ No. 59
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Coop's
Basic
Manual

Coop's Basic Manual on Fine Tuning Private Satellite Terminals. Solar outage, connectors, receiver peaking, tracking unusual orbit birds (including Molniya), measuring signal to noise ratios, footprint maps and what they mean, simple ways to adjust dish elevation and azimuth, installing and peaking the feed antenna, coaxial cable interfacing from dish to receiver(s), polarisation

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Coop's
Operations
Manual

Coop's Satellite Operations Manual. Geometry of a satellite dish (dry stuff but important to get maximum gain from your system), peaking the LNB for maximum performance (location is critical), azimuth and elevation sweep for satellites, C/N and S/N numbers - what they mean, the satellite design and the footprints it creates, rebroadcasting through the air to "friends" and neighbours, tuning in sub-carrier signals (with construction project), narrow band audio and data interception, circular polarised feeds you can build, sound in synchs decoder, and much-much more. This is one GREAT manual! Reprint of original (LtdQty), 1/2 original price.

Nelson
Parabolic
Manual

The Nelson Parabolic TVRO Manual. It take a very special person to want to build his or her own dish. Tens of thousands have done so, virtually all of them have done so by using this manual as their step-by-step manual. Nelson Ethier was one of a kind (rest his soul) and here he describes everything important in logical step by step format to build a professional quality dish up to 12 feet (3.7m) in diameter. Even if you never intend to build a dish, this manual will become a constant companion as you evaluate dish antennas others have built. This is the "bible" of antenna people (reprint of original, LtdQty); half original price.

AS LOW AS THESE PRICES ARE - THERE ARE SPECIAL PACKAGE PRICES ON BACKSIDE!

World
Sat TV 92

The World of Satellite TV (1992)/ Asia, Middle East, Pacific Rim. (Mark Long) Yes, it is somewhat out of date but the first 12 chapters (of 14) are basic and basics don't change. Nobody does it better than Long, some people we know collect one-each of every one of his books believing they will soon become collector items. We have a tiny number (LtdQty) and when these are gone at \$10, that is it for this edition.

World
Sat TV 96

The World of Satellite TV (1995)/ Asia, Middle East. (Mark Long) Updated version of above, 13 very useful chapters + two that are slightly dated (including the then new world of digital). Hey - it is Mark Long and his writing is clear and concise and accurate. Bargain priced at \$15. (QtyLtd)

TB 9404
DTH
Systems

Direct to Home: Home Satellite System Installation Techniques. Without question, the very best quick tutorial on what a home dish system is, how it works, where the problems develop. If you are new to the field or need to teach someone the ground rule basics, this is the right one. (Very) slight New Zealand bias, not enough to damage its teaching abilities no matter where you are. Plain language, in the best style of Coop. \$10 but quantity very limited - one to a customer.

TV 9405
SMATV

Satellite to Room - Commercial Satellite Dish Systems / SMATV. Originally prepared for international satellite conference in Thailand, this is the "best of" companion to 9404 (above). If you are doing or plan to do motel, hotel, condo distribution systems fed by satellite, and need to know what you will be facing - start here. \$10, quantity very limited - one to a customer.

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THREE NEW ADDITIONAL SOURCES - See page 34 of this issue!

Terrestrial TV Antenna Handbooks



Each of these editions researched, created by "Coop" to help you solve tough aerial problems

**TB
9301**

Tech Bulletin 9301. *Co-Channel & Antenna Phasing:* How to turn a simple antenna (one Yagi or broadband antenna) into a complex array with the ability to separate stations on the same channel ("co-channel interference"). Totally hands on, very practical, detailed how-to instruction covering VHF and UHF theory and practice. Go from Novice to advanced aerial installer right here! (LtdQty)

**TB
9302**

Tech Bulletin 9302. *Weak Signal Reception Techniques.* If one cut-to-channel (Yagi) antenna won't do the job, will 2, or 4, or 8? How about 16? Stacking antennas, mating with hand selected masthead amplifiers is an art. This explains in hands-on practical language and drawings exactly how to do it - building terrestrial antennas that will work to distances of 300+km!. (LtdQty)

**TB
9303**

Tech Bulletin 9303. *UHF - The Frontier.* Using parabolic style antennas and chicken wire mesh, it is possible to build 20-40 foot SUPER antennas for UHF-TV that will capture high quality pictures over distances of 300+km. Moreover, you can build on-channel relays using the techniques described here to "Squirt" signals through the air from a hilltop to a valley below - all quite legal, and very economical. The "tricks" here have been well hidden from general view previously - this is exciting, state-of-the-art stuff! (LtdQty)

**TB
9304**

Tech Bulletin 9304. *Beating Noise & Combining Cross-Pole Signals.* When TV (and FM radio) signals are weak, man-made noise from appliances, power lines can kill reception. Here is the complete step by step story on identifying, locating and curing noise generation devices that inhibit fringe area reception. BONUS - if you have vertical and horizontal polarised signals at the same location, it is possible to "combine" them into a single downline to the TV set! (LtdQty)

**TB
9305**

Tech Bulletin 9305. *Cable Television Fact and Fiction.* The story of how a cable TV system is designed, built, operated. The perfect "So this is how it works!" report. Who knows, you may get so excited by the prospects of becoming a cable TV operator, you will rush out and mortgage your house to build your own after reading this! (LtdQty)

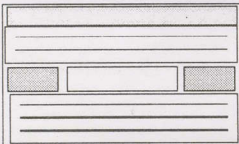
**TB
9403(t)**

Tech Bulletin 9403(t). *VHF/UHF Receiving Antenna Design.* This one started a "war" because it explains how to build your own deep-deep fringe "Logi" TV & FM antennas with three and four times

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BRAND NEW - NOW shipping for those who can't wait! "RAW" SPACE Pacific Video!



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9301/9302/9303/9304/9305 (note: does NOT include 9403). Save \$10. All five postage paid (surface mail, printed matter rate)

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OR -

- Gibson/Operations/Nelson Package/\$40; Weak Signal/Co-Channel/UHF/Interference/ Cable TV Package/ \$40;
- Gibson/Operations/Nelson + Weak Signal/Co-Channel/UHF/Interference/ Cable TV Super Package/ \$65; SPACE Pacific "Raw Video"/ \$35 (Note: No SPACE member discount applicable this item only). Total of order: \$ _____. If CURRENT SPACE Member, multiply by 0.7 for discount total (not including "Raw Video") for discount total of \$ _____

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SatFACTS MONTHLY

ISSN 1174-0779

is published 12 times each year (on or about the 15th of each month) by Far North Cablevision, Ltd.

This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer 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.

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COOP'S COMMENT

Some editions of SatFACTS are upbeat. This is not one of those. And unless you are a member of the hacker set, chances are you will come away from this issue feeling befuddled, perhaps angry, and visibly upset.

There are two approaches to hackers and hacking. Ignore them and hope they will go away. (They will not.) Beat them over the head until the crumble in a heap. (Your fists will bleed you to death long before you exhaust the growing legion of hackers).

Australian pay-TV firms have chosen to ignore hackers on the surface but beat the crap out of them where nobody (but hackers) is looking. The truth - and it is the truth - is that the hackers are winning. By a wide margin. Some of the jubilant people we contacted about this topic - all hackers we might add - were going further than claiming a lead in the battle. "We have won. It is all over but the mop up."

It happened so fast. Austar and Foxtel jumped on hackers by sending out electronic counter measure "card hits" beginning late in May. By mid-June the ECM shots were running all but continuously, grinding out data bits designed to locate and put out of commission any smart cards that had been "modified."

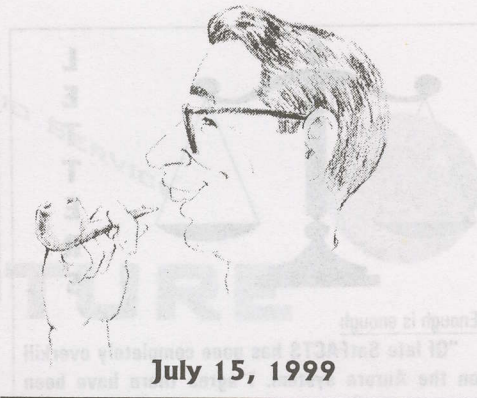
Within 72 hours, the resources of Internet turned the tide of battle. Hundreds of card enthusiasts working together quickly pinned down the technique for stopping ECM card hits dead. Drawing upon the resources of a very advanced Irdeto card busting business world headquartered in Europe, the Australian group found all of the answers they needed as well as real time European computing power that was more than willing to dissect the Austar/Foxtel ECM data stream. MOSC (modified original smart card) "designers" arrived by air from South Africa and Europe to join the battle. Austar and Foxtel never had a chance. More to the point, middle level management at both have been reporting to senior management "the card threat is over." They are correct of course - but not favourably for the pay-TV firms.

Nothing good for our industry has happened here. The parallel I draw is this: Picture business shops on fire and wide spread looting following a spat of civil unrest in a section of south central Los Angeles (you do remember Watts - don't you?).

We report what has happened to you with the same journalistic reasoning as the TV cameras, radio reporters and newspapers and magazines buried us with images of that high school shooting in Colorado a few months back. Something has been badly broken, and unless we all understand what broke and why it broke, there will be no progress to repair it. And to see that it does not happen again.

True to style, the pay-TV programmers refuse comment. Officially, nothing has happened. If the general press - those TV networks, radio reporters and newspaper sleuths - got their teeth into this one, middle and top management jobs would quickly be at risk. So to reinvent a Nixon era phrase - they stonewall the issue: "Nothing unusual has happened."

Australia is awash in MOSC devices. "Smart card doublers" and "ECM blocker devices" are everywhere. Even insignificant Aurora conditional access has toppled. Major MOSC suppliers are moving in from Europe (and Africa). It seems like this might be one of those rare occasions when middle and senior management at the pay-TV firms should stop fooling themselves with self-serving internal memos and look for a real solution. Watts is only a card hack away.



In Volume 5 ♦ Number 59

Analytical Update of Australia's Conditional Access Woes -p. 6

Pirates Spawn Creative New Technology -p. 10

Guest editorial: Is it time for a new approach to pay-TV hackers? -p. 12

Three serious problems still facing Australian satellite delivery -p. 14

Departments

Programmer/Programming Update -p.2; Hardware/Equipment Update -p. 4;

SPACE Pacific Report (Falling off the cliff) -p. 20;

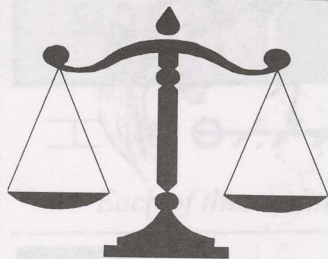
Cable Connection (finding the focal point) - p. 22; SatFACTS Digital Watch -p. 24;

Supplemental Digital Data -p. 26; SatFACTS Analogue Watch -p. 27; With The Observers -p. 29;

At Sign-Off (Internet hype and the real world) -p. 32

-ON THE COVER-

No - don't write us letters. We know that is a condom on the front cover. (p. 6).



LETTERS

Enough is enough

"Of late SatFACTS has gone completely overkill on the Aurora system. I agree there have been some dubious areas and our national channels (ABC, SBS) should not be scrambled in the first place. As a user, I think the system is run well albeit you can only receive commercial channels in your appropriate eastern or western zone. If you can prove that you don't have adequate terrestrial reception, I don't see why I should be denied access to the other state's services - they are but clones anyhow. If your 'local' terrestrial broadcaster has failed in its obligation to provide you with a suitable off-air terrestrial signal, has he not also given up rights to claim you for his exclusive service? One rip-off is the availability of an appropriate smart card for Aurora. SatFACTS says the cards are \$50 - do a private survey and try and get one. Dealers will only sell them with a new IRD, citing a 'lack of supply.' Then they offer to get me one if I am willing to pay up to \$100. This sounds very much to me like a rip-off on the rural services!"

Barry Levein, Nana Glen, NSW, Australia

It does appear true that Aurora cards are denied or are difficult to obtain unless you are purchasing a companion IRD. There was a brief period (November-December) where cards could be purchased from Nationwide or its dealers for \$50. Then something changed in the policy. We'd like to hear from others who are experiencing difficulties in obtaining Aurora cards with as many facts and figures as you can recite. Unfortunately, when legal cards become difficult or too expensive to obtain, that encourages piracy cards to appear and be sold which is precisely what has now happened. Talk about cutting off your nose to spite your face!

What is the language?

"We are after information on the nationality (language) of the International FTA channels listed in SatFACTS. If you cannot help, do you have any idea where we may be able to find out this information?"

ABC Antennas & Electronics, Southport, Qld

A few readers have suggested we somehow make room in the analogue and digital lists appearing here each month to include the language. Setting aside that this would require massive reworking of the lists, what do others think? And if we agree to do this, we'll need plenty of reader support identifying the various dialects familiar only to a trained linguist.

Letters to SatFACTS do not automatically end up in print; those written "in confidence" remain that way. Published letters may be edited for length but content is never altered.

PROGRAMMER PROGRAMMING PROMOTION

UPDATE

JULY 15, 1999

Remember Skytel - the wanna-be New Caledonia based firm promising to deliver up to 9 channels of pay-TV to French speaking Pacific July 1st? No, you did not miss their opening date - but they did. Now comes a more substantial plan to provide pay-TV to New Caledonia, Vanuatu, Wallis and Futuna (that's another French speaking island group in the Pacific in case your geography is lacking). And Tahiti, someday. Canal +, the French based dominant player in pay television, held a news conference in Noumea June 23rd to announce: 13 channels, 10 pay-TV and 3 as RFO New Caledonia, available "around Christmas 1999", using Intelsat I180 Ku steerable S2 beam. This will produce footprints as high as 50 dBw (80cm dish) at boresight. Tahiti? "In the future, using S1 steerable beam." You can check what a steerable Intelsat Ku beam is capable of - an example in this case - by going to <http://www.intelsat.com/coveragemaps/>. Yes, if you "move" the example beam shown west to centre on Noumea, there would be service in the 2m antenna class into portions of NSW and Queensland.

Taxes. Belgium has adopted annual taxation for ALL satellite TV dishes, without respect to their size, colour, appearance or location on a home. "Official" reason? To "preserve the appearance of buildings." How much? Between US\$150 and \$250 per year.

Australian CMT viewers who had previously purchased "home" DTH subscriptions are angry their D9223 receivers will not be authorised under the new encrypted regime. There were only a few such homes, but they are vocal complaining they have loyally supported CMT with subscription money even though it stayed FTA for years and could be viewed without payment. CMT has pay-TV distribution agreements in Australia, won't authorise individual PAS-2 served homes anymore.

TVSN is again uplinking through AsiaSat 2 but seems to easily get its information mixed-up. In attempting to assist New Zealand terrestrial TV network to find its signal, repeatedly gave out incorrect symbol rate. Real numbers are 4.033Vt, SR 4.298, 3/4 with VPID 308 and APID 256. This is current, "if you can load this your system is functioning very well" test since it shares uplink and power with Australian Sky Racing service.

KIBC. If you haven't looked recently, your previously loaded KIBC service (As2, 3940/1210Vt, SR 26.655, 2/3) may not be playing. Reason? ZakNet, with whom KIBC hitches a ride, made changes in Divicom uplink early in June which turned FTA KIBC into essentially CA service. Unless - unless you use PID entry routine to enter the following: Video PID 35, Audio PID 36, PCR 35. Doing it this way makes KIBC play perfectly; see discussion of loading a Phoenix 111 on our Web site (<http://www.satfacts.kwikkopy.co.nz>). Why care about KIBC? Because first four one-hour SPACE Pacific Report TV shows will be (finally) launching here late this month (schedule from our Web site.)

Herbalife on C2. These guys bounce around on a pogo stick - you may find them now on Palapa C2 3720/1430Hz in FTA analogue Wednesdays from 10-12UTC with NTSC video and 6.8 audio.

Sky NZ will "test" pay per view with 3 day replay of "Woodstock Concert" on special event channel 30. Viewers will be able to elect 1, 2 or 3 day coverage at prices that go as high as NZ\$50. When? Tentatively, end of July, early August.

PID/PCR? Service-address specific "packet" identifications which latest version of FTA digital IRDs are programmed to accept when tuning in new services.



AUDIO SERVICE



INTO THE FUTURE WITH

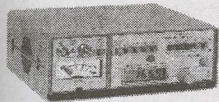
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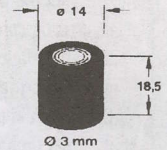
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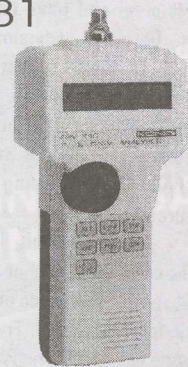
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Pinch Roller

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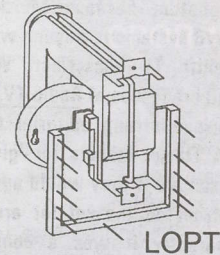
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Don't glorify Imparja?

"A friend of mine rang Imparja and was told they could not telecast the first half of the World Cup Cricket because 'it is not available.' This was a blatant lie because there it was on the 9 national (EPAL) feed. On the final, Sunday the 20th, they ran the event 30 minutes behind real time and anyone who might be listening on the radio was totally confused! They have to realise they are in the 'big leagues' now and should consider the wishes and interest of the majority. Their 'national expansion' is going to fail unless they are more considerate - and honest - with their viewers."

David Nolan, Katherine, NT

We have received several 'complaints' about the amount of SF 'space' dedicated to the expansion at Imparja. At the moment, they are the only 'national' service that is making an effort to work with viewers throughout Australia and they deserve support and recognition for the risks they are taking. As for their failure to be honest with viewers concerning programming choices - are any of the programmers 'truly honest' in this respect? Don't 7, 9 and 10 routinely cut 2, 3 or 4 minutes from programmes they import from the UK or USA to make room for additional advertising content? There is and always will be a delicate balance between "serving the public" and "making a profit" which is why services such as the ABC remain important to the world (even if they did shut down their PAS-2 Ku service which reached New Zealand!)

HSS-100C questions

"In 1996 I bought a Hyundai HSS-100C digital receiver. My question deals with the RS-232 data port on the rear apron. I have written many letters to Hyundai and have only received one answer - from Germany, advising me to write to Korea (which I have repeatedly done without any responses). Can anyone tell me what the 232 port does, and what it offers? So far I cannot locate anyone who can tell me! I also want to thank SatFACTS for providing such good information, so accurately!"

A. De-Stafanis, Tootgarook, Victoria

The unabashed 'king' of the HSS series 232 data port is Observer Stu McLeod of Napier, NZ, as we related in SF for March 1998. Try him at 64-6-844-3706 or write him at 3 Norrie Place, Tamatea, Napier (NZ).

History repeats (and repeats and repeats)

"All of this hand clapping and shouts of indignation because Murdoch is giving away BSKyB systems to anyone who agrees to become a satellite TV subscriber. While archiving some 1950 era issues of Radio TV News recently, I came across a strong editorial that was condemning USA TV set makers for 'giving away TV sets to consumers if they would agree to a 3 year service contract on the set for around US\$50 as year.' Apparently it was a common practice as TV makers looked for ways to dump their surplus capacity and understandably the retailers who were caught in the middle were up in arms. Lest you think it was only off-brands, think again. Zenith, RCA, GE were the pushers of this!"

L.R. Standman, Denver, Colorado

HARDWARE EQUIPMENT PARTS

UPDATE

JULY 15, 1999

Single chip IRDs. We were told they would be faster, cheaper, easier to operate. Nokia's 9800S was scheduled to ship May 17th. A few (very few) got out the door. Our evaluation unit has not arrived, they say late August. Eric Fien found a single chipper at Singapore show made by a Taiwan group measuring 5" by 3" by 1.5" on a PC plug-in card; price, US\$500 range. He was impressed, bought one, awaits delivery as we go to press. First models are all FTA, CA and CI versions apparently are coming later.

Digital signal meters and spectrum analysers. First versions are bouquet and satellite specific, typically don't do SCPC symbol rate ranges which is a shame because the guys who really need these babies are the people trying to do SCPC Internet sites. We expect the present problems to be solved by September with a range of choices by November. If you have been itching to invest in one - wait a few months.

MOSC - Modified Original Smart Cards. In our report on innovative pirate technology, we mention "card doublers" (p. 10). European Web sites have them advertised in range of US\$50. One Australian version described to us can be mounted inside of IRD to "hide" it from view. Another sits outside, has LED that "flashes" when the device is "doing some work" (translation: it is blocking hits from the cards). In a whimsical mood, we have suggested they provide an LED "hit counter" to record how many ECM hits the device has taken!

Ponder this. If England's BSKyB will give you a free Digibox DTH system when you agree to subscribe to their service for a year, and (Australian retailer) Harvey-Norman will give you a free PC system for your home if you agree to subscribe to a specific ISP for a year or two - why won't Austar and/or Foxtel give a free subscription to people who agree to give up hacking their cards - a 30 day "Amnesty" period allowing hackers to turn themselves in against a promise not to prosecute?

Comet installers who fail to turn up for an "inventory" of their consigned supplies are terminated immediately. So too - if they do turn up and don't have everything in their possession that Comet records indicate they should have.

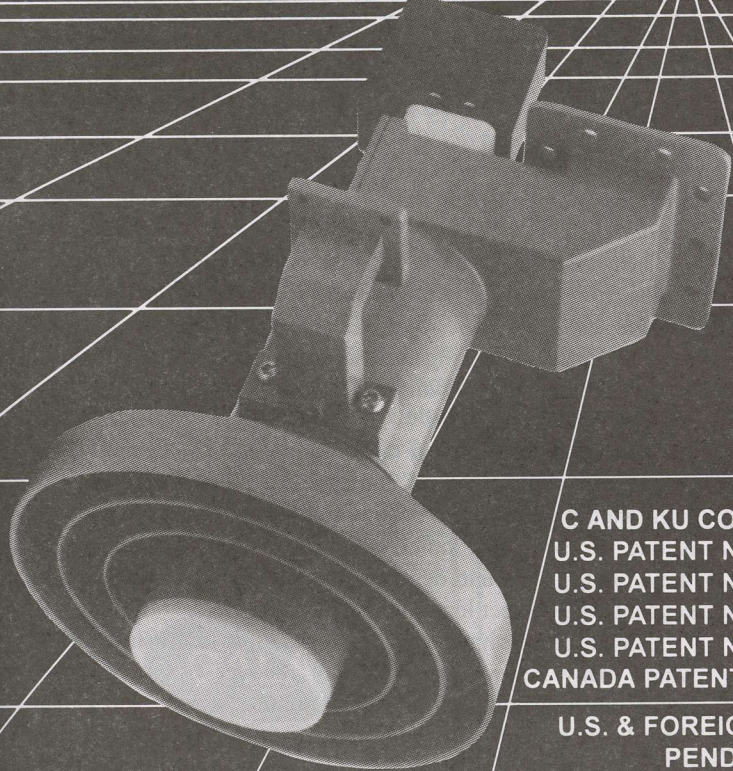
Sky NZ has activated a software upgrade to Zenith and Pace IRDs that allow subscribers with S-VHS or RGB inputs on their TV sets to realise "enhanced" picture quality. "Sky Network 200" is on screen menu designator for latest changes. Advanced set-up menu allows installer to select composite or S-video output through VCR Scart, composite or S or RGB through TV set Scart. Teletext has also been added through UHF modulator output (VBI inserted). One practical problem - Scart jumper cords are very difficult to locate and most have only 5 pins wired. A hint - the "fat wire" model is the 5-wire while the "thin" wire model has all 21 connected.

C&W Optus is aggressively marketing SMATV service to motels, hotels in Tasmania, perhaps elsewhere. Commercial clients select from various channel packages starting at 2 (movie) services up to maximum of 17. Motels typically must be rewired for expanded bandwidth cable distribution, purchase UEC 660 IRDs (A\$1,100 each) and other 'headend' equipment. Channels come from the B3 Optus + Austar service group.

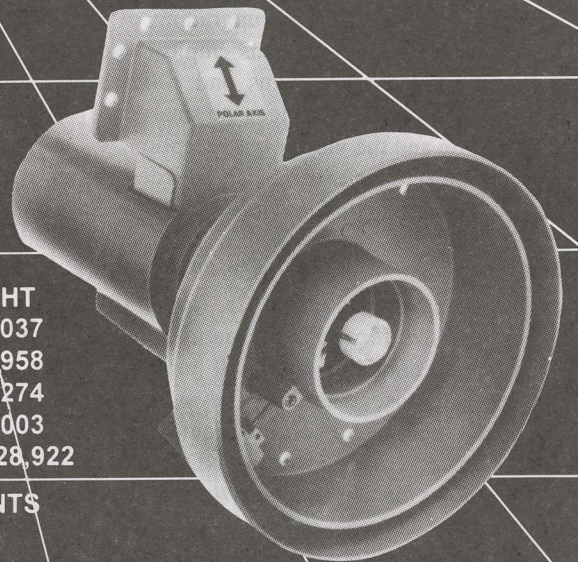
NDS, the CA system designers behind Star TV Asia, BSKyB et al, has signed contract to provide custom-to-China conditional access system. Chinese are responsible for scrambling codes, NDS for hardware. System is to be used for terrestrial, cable and satellite and is purposefully "unique" to China.

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NEW ADL Web site - www.adlfeed.com

ANALYTICAL UPDATE of AUSTRALIA'S CONDITIONAL ACCESS WOES

Australian politicians argued long and hard to ensure pay-TV consumers did not end up with a "stack of decoders sitting atop their telly." The Parliamentarians believed by adopting a single conditional access (pay-TV) system, consumers could select programming from two or more available services without the need for separate decoders for each service. This was the foundation for the original Galaxy selection of a General Instrument (early version MPEG 1.5) system in 1995, and the upgrading of that initial system for Irdeto in 1996. CA systems employ algorithms (mathematical "keys") to calculate sums and differences. When the keys provided to the CA device (the smart card) "match" the IRD is turned on and the viewer has reception.

"Some (CA) systems (such as Irdeto) send a service key to each subscriber and update it (daily, weekly, monthly)." (1) In this case, the service key is transmitted inside of the data stream by the service provider. Pirates work out how to display the data stream on their PCs, isolate (often by trial and error until the identification information becomes widely known) the particular data bits that will turn a decoder on, and then "extract" those data bits (keys) from the data stream and implant them into a non-functioning smart card.

"Other systems (such as NDS) use a different approach, generating the key *inside* of the secure smart card based upon input received from the broadcast end." A system based upon internal generation of keys will build into the design software traps which will fool or stop the unwary pirate. Pirate cards for internally generated keys are more easily dealt with at the ECM level because the internal algorithm routine can be varied externally.

"When the broadcaster decides to introduce a totally new replacement device, they can knock out existing pirate devices and force the pirates to begin their piracy efforts from scratch. Many of the security systems offer the added ability to electronically target and invalidate the pirate devices while allowing legitimate devices to continue operating.

"This is a constant battle, with the broadcaster continually having to keep one step ahead of the pirates and at the same time supporting his legitimate subscribers."

1/ This report contains extracts from a paper written by Howard Silverman, CA Tactical Marketing Manager for NDS (www.ndsworld.com)

"Generally the pirate does not attack the encryption system since this is difficult to crack. Rather, the pirates focus on the CA system where the weakest link is the key input to the encryption system. In general, two approaches are popular. The pirate can eavesdrop on messages sent to legitimate subscribers and extract the necessary secret keys from those messages. Those messages are then sent to devices at consumer homes which thereby become entitled and able to provide the key.

"Alternatively, the pirate can reverse engineer the CA system and produce his own devices which illegitimately provide the keys. One such device is a clone card, which receive the same messages as a legitimate card and thereby become entitled for whatever (services) the legitimate card receives."

The *italics* portion of this report - to this point - was prepared in a paper by an employee of NDS. There are two significant players in the conditional access world today: NDS is one, Irdeto is the other. The Irdeto system transmits its "keys" in the open and depends upon the smart card to slot the keys into the correct location.

Circumstances have created a situation in Australia from which many believe Irdeto cannot recover. As long as the "keys" are transmitted in the data stream, hackers will isolate those keys, extract them from the stream, and reinsert the keys into smart cards.

The cards

The Australian situation is aggravated by the failure of Galaxy (see SatFACTS June 1998) which was followed by nearly three months of chaos. During those three months, Austar arranged for the continuation of the Galaxy feeds which in turn allowed Austar customers to continue to have television. Before the failure, Austar and Galaxy shared the feeds and to some extent the authorisation control centre for smart cards. During that May-August period, several thousand ex-Galaxy IRDs and cards simply "disappeared." Galaxy records, assumed by Foxtel, were at best incomplete and Foxtel attempted to rebuild records by asking viewers (not at the time Foxtel customers) to "turn in" their DGT400 IRD numbers and the smart card numbers as well. Some quantity did not oblige and a grey market made up of missing IRDs and cards developed. Readers report locating complete IRDs with cards at Sunday swap meets for as little as \$25.

Tale of the card blocker

A mechanical (electronic circuit) card blocker sits between the modified card and the data stream to ensure that ECM (counter attack) data does not reach the card and turn it off - or worse. A card blocker consists of a pair of 16C84 or 16F84 ICs and a handful of parts. Parts cost is typically under A\$50. The sale of card blockers is presently a "grey area" inside of Australia (it appears legal but how do you disguise - as a seller - the board's real purpose?). Even if Australia somehow managed to control their sale internally, "foreign" Internet sites are filled with blocker kits (parts you assemble yourself), assembled blockers (ready to use) or simply construction instruction (for which you can locate all of the parts required at Dick Smith and other local outlets). Assembled and ready to use blockers are in the region of A\$150 but are likely to come down in the face of competition.

Quick Summary of status of Irdeto card hacking in Australia

Virtually any person with modest PC skills and a Mark 12 or 13 card programmer can begin with the correct version of a Galaxy/Austar/Foxtel smart card and - (1) Turn it back on if it has been previously turned off, (2) If already functioning - even after having been turned back on using Mark 12 and 13 techniques - enhance the card so that it opens up virtually all of the service packages available.

People with no interest in doing their own cards can "trade" cards (whether functional or not) or cards + cash for "enhanced" cards (see below).

Foxtel/Austar is wise to this and transmits "ECM" (electronic counter measure) hits on cards as frequently as every 90 minutes. A card which has been "hacked" back on (from an official-off state) or is a paid card but enhanced with additional services will almost certainly fail under ECM "attack." Thus you could spend money or trade off cards only to have reactivated service for as little as 90 minutes time. Hackers equipped with Mark 12, 13 reader-writer devices simply re-enter the numbers after each hit or as often as required to watch TV. More advanced ECMs destroy the card's "clock" and may do more damage than simply shutting the card down temporarily. Anyone lacking the skills or equipment to deal with a constant ECM attack will have a very brief period of pirate card reception.

There is a countermeasure to ECM attacks.

"Card blocking" is the technology of placing something between the card (once modified) and the incoming data stream which contains the ECM message. There are presently two types of "blocking." One involves special software and the other requires a mechanical "ECM blocker" circuit. The software approach is primarily limited to people who have access to the Dr Overflow software for the Nokia series receivers or similar (Internet available) software. As the software only functions with a small number of (Nokia) receiver models, the software "solution" is presently not an option to those using other IRDs (such as the original Pace DGT400s). For non-Nokia blocking, you have to install a mechanical (electronic circuit) blocker which becomes a "buffer" between the modified smart card and the IRD (data stream).



Original card (above and second generation card (right))



Ex-Galaxy cards became a commodity in commerce. As the hacker's skills improved, they learned how to reactivate cards that had been turned off. Later they would learn how to add channels to cards as Austar and Foxtel began "tiering" (offering different service levels).

They found that different generation cards responded with different results. The original (first) generation cards (see left), identified by not having an arrow to indicate which end goes into the IRD first, became less desirable than those that followed (identified by their arrow).

The "value" of the cards on the grey market was shortly reflected by offers to "swap" or "trade" turned off cards for hacker-reactivated cards. Advertisements appeared on Internet offering various combinations (see below). Those advertising offered to take two "arrow" cards not working and replace with one "arrow" card that was working. Or they would take five of the non-arrow cards and send back a single working arrow card. Many people were dubious with the offer: you have to send your non-working cards to Cape Town, South Africa!

The blocker

Foxtel and Austar were not playing dead. Certainly they knew of the high level of hacking with Irdeto cards in Europe and Africa. They also understood the instant access to hacking information through the Web, and just as likely had asked their

Having grey market IRDs and/or cards in one's possession was one thing; making them work something else. As Foxtel assumed responsibility for the ex-Galaxy subscribers and attempted to create order out of chaos, cards that should exist (by sequential serial numbers) but were missing from either inventory or the subscriber data banks were isolated. "Hits" were sent out to turn them off, just in case they were sitting out there providing somebody with free TV. That was step one.

Step one was sufficient to pique the interest of would-be hackers. *Could they turn the cards back on?* Europeans were reporting significant success with other Irdeto cards - why not in Australia?

You supply two "arrow" cards and receive back one enhanced card >

You supply 5 "no arrow" Galaxy (Foxtel) (Austar) cards

and receive back one enhanced card >

You supply one "arrow" card plus A\$150

and receive back one enhanced card >

You supply no cards and A\$250 and receive back one enhanced card >



Quick history of satellite television encryption

Analogue encryption technology dates to 1982 and a system created by Oak Industries (USA) which was initially adopted by Canadian 'Anik' services. The Oak system and the next generation approach by General Instrument called Videocipher relied on the transmission of "secure algorithm keys" within the video (or audio) analogue signal. Neither Oak nor GI elected to utilise a removable security device (i.e. smart card) which made both systems vulnerable to reverse engineering. The earliest digital encryption routines followed that approach but apparently with greater success; the Scientific Atlanta PowerVu remains "unbroken" to this day and although it has the ability to upgrade to a smart card at some future date (a built-in expansion system), there has been no need to do so. Every other system has been broken.

The smart card does not automatically guarantee greater theft protection if the encryption system elects to transmit the "keys" within the data stream. Irdeto does this, by design, and that has been their soft spot from the beginning of the system. Basically, you have a lock and key system but you leave the key out in the open where anyone who wishes to may use it. NDS leaves the "key" inside of the smart card and transmits algorithms which force computations within the smart card to create the key each time it is required. The calculations are hidden from view and the key is never seen by the user.

The Irdeto system has been "cracked" for nearly three years now, first in Europe, more recently in Asia (Thailand) and Australia. Specific regional "keys" are assigned to each area but a skilled hacker can modify the regional key within the smart card which simply means cards that are intended for one region of the world (such as South Africa) can after modification be used virtually anywhere else.

legal departments for views on how existing Australian law might play in the card hacking world. There were several options:

1) Do nothing, accept that a few thousand - perhaps 10,000 eventually - cards would find their way into grey market hands. They also knew that even with a few thousand DGT400s not accounted for, there were going to be far more cards than IRDs "loose." At some point the hackers would run out of "cheap" IRDs to hack with and the momentary brush with piracy would stabilise for lack of IRDs.

The only thing wrong with that analysis were the UEC 642 IRDs. 12,500 initially for Aurora, later thousands more 660s for Sky Racing, Victoria schools and who knows what others. Moreover, IRDs from Europe could be imported as well.

2) Fight back with ECM. They could make life unpleasant for the hackers by continually sending out "hits" that would destroy the date and clock functions of the card + IRD. Destroy the "timer" and you shut down the card. For as long as it would take the hacker to reprogram his or her card. Tests were run in April and May, then during June the ECM hits were turned on around the clock.

For Austar/Foxtel, this had an unfortunate effect. Europeans already knew about "ECM blockers," a technique that allowed the hacker to "isolate the reprogrammed card from the data stream" so that ECM hits would not reach the card. Blocker technology was amusing but not mandatory until June in Australia. Now from a mere handful who understood blockers prior to the constant ECM attack, there are hundreds and perhaps thousands who are conversant in blocking technology. Austar/Foxtel raised the level of competency of hackers by creating something they had to fix. To date, ECM has created two grades of hackers: Those who can't handle the blocking technology (the so-called slow learners) and those who can. The ECM tactic did not shut down the hackers - *it made them smarter.* (The ECM strategy in continually running the attack on cards is that hackers will "tire" of constantly reprogramming their cards. What Austar/Foxtel underestimated were the technical options available to hackers to fix their systems so that ECM hits would not affect them.)

3) After ECM attacks come more complex software manoeuvres. Changing provider number (codes) is one.

Unfortunately, the next level of fighting back (after ECM attacks) is an expensive one for the programmers. Europeans advise SatFACTS they believe Austar/Foxtel would be forced to replace an entire universe of existing smart cards with new ones in the next step. How big a universe? Perhaps more than 100,000 cards.

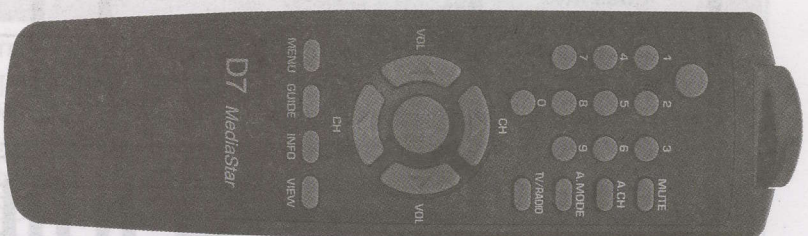
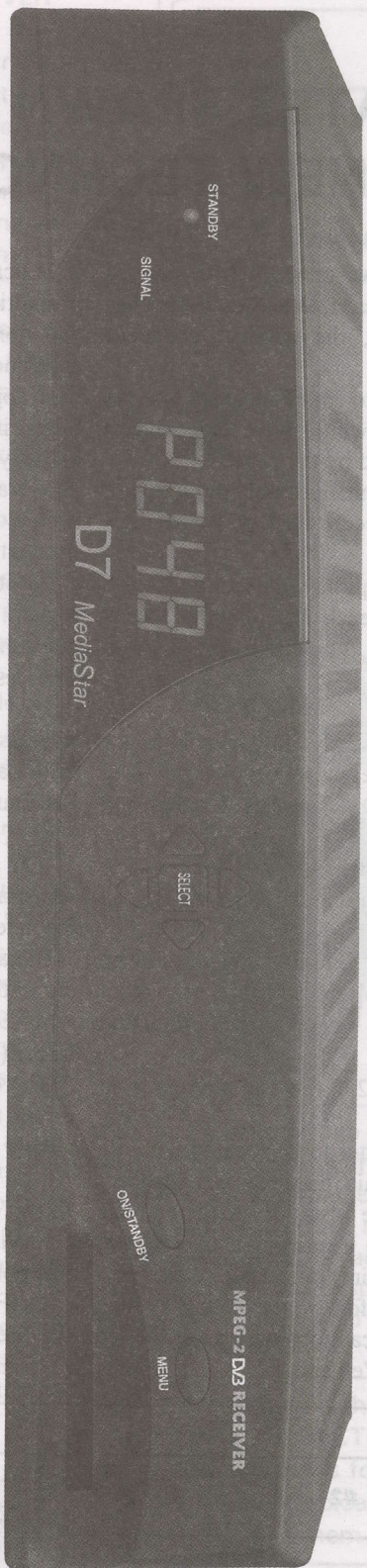
The downside of that is the hackers are on a perpetual "learning curve" and nothing gets their adrenaline racing quicker than a new problem to solve. It is this "human element" which the mostly young and inexperienced management at the smart card control centre have ignored to date. And to their peril.

"The game is finished. One has to but look at the significant progress made by the Europeans, especially the Germans, in dissecting the Irdeto system to understand that with Internet as a tool, Irdeto cannot do battle with hackers on a continent by continent basis. Officially, they exude confidence that the hackers can and will be beat. Irdeto was first put into operation in South Africa with the Multichoice system. And the South African hackers have had the longest period of time to work their way around the CA roadblocks. Do you see *where* we are being asked to send our defunct ex-Galaxy cards for replacement? *Cape Town, South Africa!*"

The speaker is an occasional caller to SatFACTS. He never gives us his name, always calls from a pay telephone. He is Australian. That is all we know.

"I don't dislike Irdeto, nor Austar nor Foxtel. But I hate stupidity and these people are acting stupid. I have never sold a card to anyone, I have never given one away. Nobody knows I am intrigued by this situation. I just shut the door to my den each evening and bury myself in the Internet exchanges on this subject. My wife thinks I am just playing on the net. I guess I am - but I cannot let go of this challenge because secretly I keep hoping the programmers will wake up and come to their senses. There is a shoe box filled with - maybe, 80 cards. All work on most or all of the present services. Each one was programmed slightly different from all others. Every card's number and unique characteristics are logged in my PC. Beside my PC is a small work bench, presently covered with more than a dozen variations of the blocker circuit. All work, right now I'm intrigued by how we can block without all of those parts. You know, the way Dr Overflow does it with the Nokia IRDs."

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PIRATES SPAWN CREATIVE NEW TECHNOLOGY

Here is the situation. You have two or more Irdeto based IRDs each of which requires a smart card. When each IRD has a valid card inserted into the slot, the decoder produces approved reception.

Suppose you could utilise one card to simultaneously operate two or more IRDs? And each IRD would have independent access to any of the channels approved by the card?

Now suppose the device that made this possible did not care whether the Irdeto card was an official card or a "MOSC" (modified original smart card)?

Welcome to the innovative side of piracy. One card, up to 6 IRDs all running off of one card, each IRD having totally independent access to every channel the card is approved to receive.

Smart Card Splitter

This aptly named device is presently only available for Irdeto format conditional access. We show a typical six-way split hook-up below; model SP-IRDx3 handles 3 cards and sells in the range of US\$250.

The promotional literature (1) lists the following features:

✓ No effect of ECMs as long as "original" smart card is used with the unit

Translation - no "ECM blocker" is built in so those who attempt to use the splitter with a pirate card are at risk of losing the card's functions unless a separate "protection device" has been incorporated.

✓ The splitter can be located up to 250 feet (80 metres) from the actual IRD

The standard "kit" allows the splitter to be located within a few metres of the IRDs. When this distance is exceeded, junction boxes (provided) allow the installer to extend the RJ11 family cable connectors up to a maximum of 250 feet using 4-core (such as telephone wire) material. Wiring is colour coded and extensions must follow the colour coding exactly. There are several other precautions which are spelled out in great detail on the supplier's Web site.

Locating users of this system is not easy (although the promotional literature does specify Australia's Optus, Astar and Foxtel as "compatible") so we cannot tell you with any assurance the Card Splitter is a viable product. The product first appeared on the Web in January, deliveries apparently began in March and at this time only a 3-card split version is actually "available." The Web site documentation is way above average and if the installation manual supplied is even more complete, it at least looks as if a considerable amount of product fine tuning time has gone into this gadget.

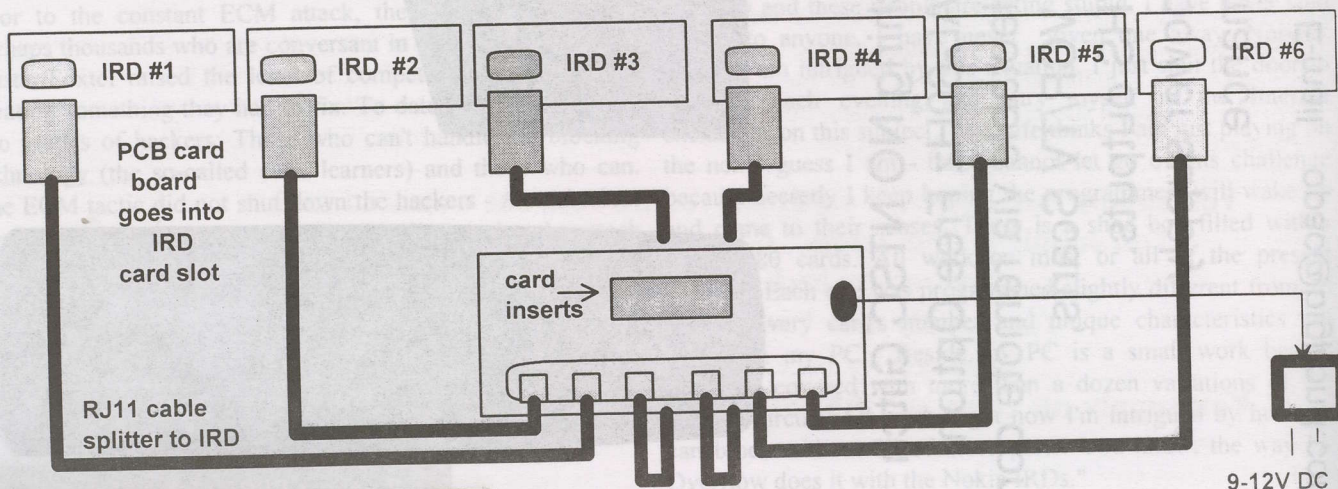
But it is difficult for us to figure out how you would use this for any legitimate situation. Why would someone want to take one smart card and use it for two or more totally separate services simultaneously unless they were deliberately setting out to "rip-off" the service provider? For now, it is "there;" it appears to be available, and there is one more bit of information. Buyers are sending money (by wire transfer) to Pakistan. Yup, Pakistan.

MOSC

On June 22, a Web site of uncertain location announced "Australian MOSC" cards. Modified Original Smart Cards are the latest craze in the piracy world - after starting with an "official" or "original" smart card that may or may not currently be active, hackers then reprogram the card for renewed use. Either for the original channel package or a larger (enhanced) channel package.

The original Web site posting directed people (in Australia) to go to a firm in Melbourne. The Melbourne firm would supply "blockers" while the cards would come from South Africa (see p. 6). After twenty-four hours, the Melbourne firm's contact information disappeared from the Web site. Curious minds wondered why it was there to begin with if they had nothing to do with the "offer."

SatFACTS located the people who run the site, asked why the Melbourne firm had been (briefly) listed and received this response:



"The Web site was created by us and was NEVER EVER under the banner of (name of company) in Melbourne. We had negotiated with several Australian based companies and were misled by the positive attitude of (name of company) at that stage. We've made a mistake by putting (name of company) contact details onto the Web site without them knowing it and corrected this a day later when (name of company) complained about it. Sorry about that."

At most, it appears the Melbourne company may have been considering supplying "blockers" for use with the South African firm's MOSC product. Like the card splitter, one has to ponder why anyone would acquire a "blocker" unless they were in fact utilising hacked cards in their operation. It turns out the South African firm has actually thought of a way to expand the blocker product so that it does have a possible legitimate use.

"We have our own line of blocker products. One of these is a two-card slot device that allows the user to insert two separate cards (such as one for Aurora, another for one of the pay-TV services). Now the user can use his/her remote to switch between services and the correct card is automatically selected. This ends the need for the person switching services having to get up from the easy chair, walk to the IRD, take out one card and insert the second card."

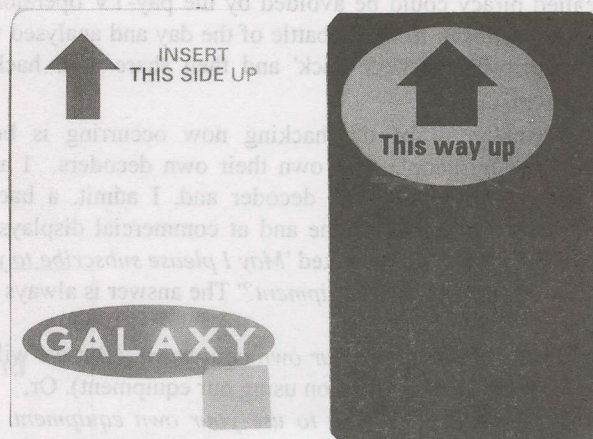
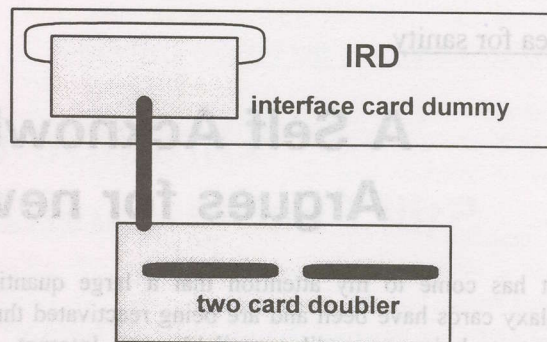
Oh yes - in the "Smartcard Slot Doubler" (their trade name) a built-in blocker circuit "protects" the cards from ECM attacks. They plan to market the "doubler" as a card switching device to - as they wrote to us - "...avoid legal problems."

What all of this says about the ingenuity of the people engaging in commerce in the grey areas explored here is difficult to summarise. One conclusion is inescapable - not all of the clever minds are employed by Irdeto, NDS or the programmers! Nor is this a totally nerd-driven subset of culture. Yes, the really creative people who initially break down the codes and technology employed by Irdeto et al are not your average hackers. But once somebody has done the hard work, invariably the information they have uncovered makes its way into the grey commerce realm. A recent report to SatFACTS from Christian Mass, aka Dr Dish at Germany's Tele-Satellite Magazine:

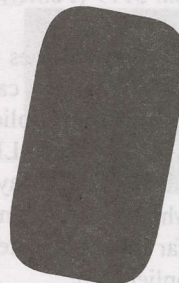
"The distribution of Irdeto MOSC and new from scratch cards has taken an ugly turn here in Europe. The people now supplying the cards seem to have been taken over - if that is the correct phrase - by a criminal element. I have heard them described as 'The Mafia' although I cannot be certain of either the accuracy of that phrase or precisely what it means. Recently a new hack which was so superior to all previous

hacks that it threatened to upset the distribution of Irdeto-hack cards appeared here. A free lance hacker in (East) Germany discovered the 'keys' to the new hack after acquiring one of the new cards from the grey market source. And he released the detailed instructions to 'hack the hacked card' on Internet. The next morning, after posting the hack, he was discovered hanging by a rope around his neck from a tree in front of his home."

1/ After counting the number of trees surrounding our home, SatFACTS has decided not to publish Web site addresses for the various firms mentioned in this report. Dedicated Web surfers will discover them on their own.



GALAXY

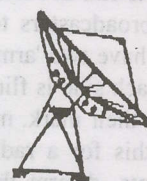


User selects which pay-TV card is to be used and Smartcard Slot Doubler makes the connection.

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A Self Acknowledged "Combatant" Argues for new Pay-TV Approach

"It has come to my attention that a large quantity of ex-Galaxy cards have been and are being reactivated through different techniques readily available on Internet. This so-called piracy could be avoided by the pay-TV operators if they stepped back from the battle of the day and analysed why the majority of hackers 'hack' and then share their hacking results with others.

"Virtually all of the hacking now occurring is being perpetrated by people who own their own decoders. I am a person who owns his own decoder and, I admit, a hacker. Repeatedly, on the telephone and at commercial displays for Foxtel and Optus, I have asked 'May I please subscribe to your service and use my own equipment?' The answer is always true to company line:

"No, you may not use your own equipment. (But we will be happy to take your application using our equipment). Or,

"Yes, we will allow you to use your own equipment. The 'connection fee' will be dropped from \$199 (Foxtel) to \$149 in recognition that you are supplying the equipment.

"This policy is an insult. I believe it establishes the ground rules for hacking: the very people who have the capability of being hackers are discriminated against by this policy. People who own their own decoders, their own dish and LNB, do not require the services of an installer. I hesitate to say this but it should be obvious - most people who own (have installed and now maintain) their own dish are far more competent than the cowboy installers most pay-TV suppliers hire.

"All these potential customers require is a service authorised smart card and the accounting records required to send them an invoice monthly. I believe this deserves far more than a '\$50 discount' from the normal installation fee.

"Where we are today is nowhere. Pay-TV suppliers are employing highly paid, dare I say it - wet behind the ears - programmers to create software ECM attacks on hacker cards. This has to be costing programmers significant money. At the same time, the hackers have the luxury of unlimited time on their hands and their interconnection via Internet. Hackers place no value on their 'time' so if it takes ten hours or a hundred hours to find the missing key, it is not important. Each time hackers knock over an ECM effort, the programmers - on the other hand - have to pay big bucks for a few hundred programmer hours to create the 'next' level ECM. This can only end badly, for the programmers. I assure you - programmers will run out money, patience or both long before the hackers run out of enthusiasm.

"What is sad about our present scenario is the failure of the pay-TV broadcasters to recognise a commercial opportunity. We now have two 'armed' camps on opposing sides of a deep chasm. Each side is flinging arrows and spears across the gulf. A few hit their mark, most fall harmlessly to the depths below. How is this for a radical suggestion: Turn the hackers into compatriots, disarm them by offering realistic prices when they supply their own equipment. Form an 'Advisory Board'

made up of the top hackers, actually let them advise you on what makes sense and what does not for theft-free service!

"Is it too far out to suggest that Austar, Foxtel and Optus could actually benefit by having a working relationship with the hackers? The current pay-TV philosophy parallels that of NATO; *bomb the crap out of the hackers and they will submit to our will!*

"Constant ECM attacks on hackercards has been the greatest boon to hacking we have seen to date. Prior to the ECMs, people pretty much hacked in a vacuum; each did his own thing, nobody shared much in the way of information. Since the advent in late May of daily ECM attacks, the hackers have pulled together as a cohesive group. Information flows at megabit rates hour after hour as thousands (and I do mean thousands) of hacking enthusiasts share everything they are learning. I am reminded of the fable that sits a monkey down with a typewriter. Sooner or later he will produce a novel. Multiple that monkey by several thousand and the 'computing power' of the programmer ECM attacks is divided to a very small number.

As long as pay-TV and Irdeto consider the code stream to be proprietary, some will find it a challenge to bust that stream. That is human nature. Legislation that attempts to punish people for dissecting the airwaves will not work (the last one who tried this was Hitler during WW2): it will only drive the dedicated hackers further into the greyness of Internet. The code stream of Irdeto is unchangeably 'open' to anyone who understands the principals at work. The only way to hide the code stream keys is to redesign the system.

"The ECM attacks have escalated the development of 'blocker systems.' I suggest that had their been no ECMs during June, blocker technology in Australia would remain known only to the top 1 or 2% of hacker enthusiasts. After a month of concentrated ECM, Internet suggests virtually everyone of the thousands of hackers is now conversant in blocking technology. The incentives are backward here.

"There are plenty of good receivers on the market which accept hacked cards. To deny fairly priced 'paid subscriptions' to people who own their own systems is a significant mistake in business judgement. To stand across the gulf chucking spears and arrows at the 'enemy' is a terrible waste of manpower, brain power and investor assets. The time has come for the technical gurus who have the management authority to summarise corporate positions to admit 'the battle is over.' There is nothing - nothing - the pay-TV people can do to correct hacking except to deal on a fair and equitable basis with the people responsible for hacking. Anything less is a sham on corporate responsibility and if I purchase some of the newly issued Austar stock, I'd make a point of raising this issue at stockholder meetings. The present approach is as outdated as Hitlerism and clearly does not work. It is time for radical, new thinking. Nothing is lost, everything is gained and everything is transformed - a basic Law of Nature."

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Three Serious Problems Still Facing Australian Satellite Delivery

The Aurora "Stand-off"

As SatFACTS has reported continuously since February, the very face of Australian "rural" telecommunications is changing as the Aurora delivery platform gathers momentum. Aurora, the digital delivery project, is now in its final turn-on phase as 2,400 Victorian (state) school systems convert from old fashioned B-MAC to digital. One television broadcaster, Imparja, has stood out as being significantly more motivated by the business opportunities of digital than its fellow broadcasters (Central 7, WIN-TV, GWN, ABC, SBS). Imparja has jumped at the opportunity to sign-up new viewers as far away from Alice Springs as central Tasmania (SatFACTS June, p. 18). This, in turn, has recently been met with strong, vigorous, perhaps even organised opposition by other terrestrial-only regional broadcasters.

Here is the scenario as of mid-July. Until late June, if you were a consumer and you lived in a location where you could not receive the terrestrial TV signal of national 9 and 10 networks, Imparja would - after some paperwork - turn you on. And Imparja was chasing new viewers with enthusiasm, backing local satellite dealers in Tasmania, Victoria, Queensland and NSW with brochures, advertising materials, even bumper stickers promoting the "national reach" of the 9 and 10 networks through the Imparja Aurora service.

But then regional broadcasters "woke up" and realised that unchecked, Imparja could chew some significant viewer hunks out of their ABA defined "territory." The ABA gets into the act because it believes it is responsible for maintaining "order" in the Australian telecasting world. There is a cosy relationship existing between regional telecasters, the national networks and the ABA. Some would say it is "too cosy" for the public good.

Each time a home located inside of the Tasmania WIN-TV coverage "circle" elects to watch Imparja (and companion service Central 7) via satellite, the satellite services "gain a home" to count for advertising sales purposes while the folks at WIN-TV lose the same home. Multiply that by several thousand homes and over time, WIN-TV has to adjust its advertising rates *downward* to reflect reaching fewer homes.

Now the problem. People are not electing to spend upwards of \$1,500 for a satellite system because they are unhappy with WIN-TV. They are buying a satellite system because they live in a spot where WIN-TV cannot be adequately received - if at all.

TV engineers - the honest ones - will readily admit that VHF (and UHF - which is a special problem in Tasmania because of the hilly terrain) waves do not bend over or plough through big hills and mountains. But until the "satellite option" came along just a few months ago, people who WIN-TV says can receive them but who in fact cannot - had no choice. It was watch a snowy, ghost riddled WIN-TV picture or watch no TV at all! But for as many years as WIN-TV has been on the air,

it has been "selling" advertisers on the number of homes it reaches *on paper*.

On paper?

You take a map of the coverage region, locate the transmission tower on the appropriate hill or mountain top and then draw a few circles around the transmitter site. The nearest circle is the "primary coverage zone" and in theory every home in that zone can receive WIN-TV. The second circle is the secondary coverage zone, and again if the homes will install an appropriate outdoor antenna, they too will receive WIN-TV. *In theory*.

The difference between "paper coverage" and "real coverage" may amount to 20% of all homes located inside of the paper coverage map. World-wide, ten percent is accepted as 'normal'.

WIN-TV jealously guards the homes inside of its "paper coverage" zone because the sum of all of these homes adds up to their advertising rate. The larger the number of homes, the more money they can charge for advertising.

So along comes Imparja and Central 7 as a team and suddenly WIN-TV is being told about homes located *inside* of its paper coverage zone who are "defecting" - going to some other transmission source for their programming. WIN-TV complains to the ABA saying, in effect - "*What the hell is going on here???*" You (the ABA) assigned us the 'exclusive rights' to our coverage area and now you make a ruling that allows some competitor from half a continent away to jump in here and 'steal' our viewers. *Cut it out!!!*"

Late in June the ABA advised it was changing the rules. If a home was clearly located outside of any other station's (ABA defined) paper coverage area, that home could still be 'turned on' for satellite TV. But - if a home was inside of another station's zone, permission to activate the smart card for the conflicting satellite service would be withheld. And where previously the ABA would accept on-site measurements (see SatFACTS for March, p. 20), no more.

It appears the ABA has gone spineless. Unable to take the heat from a growing list of regional telecasters who wanted the erosion of their paper coverage zones stopped, the ABA decided to withdraw their approval procedures. Moreover, those who have queried the ABA about this policy reversal are being told, "*This matter will be debated on the floor of Parliament - soon.*" When you can't make a rational decision, duck and run. And pass the ball to somebody else.

Call it bad (or perfect) timing. Call it a coincidence. But Aurora cards have been hacked. Just like the big boy cards for pay-TV. Which means?

It means that if the ABA won't allow Central 7 into a home in the region claimed by a Tasmanian broadcaster, there are now ways for the card that inserts into the viewer's IRD to be reprogrammed so the home gets Central 7 anyhow. Moreover, hacked cards can be reprogrammed for any one "extra" service (such as Central 7) or for all Aurora services (GWN, WIN, even the Optus Business Channels). A message to the ABA -

by shutting down commercial TV service applications, you have just given the hackers *another* reason to exist; welcome to the 21st century.

The Pay-TV Internet Ploy

We tend to live in a narrowly defined world; pay and free to air television via satellite. A few of us toy with audio-only services, a few more deal in narrow band data systems. And most are aware that somehow, sometime soon, Internet will be as common through a satellite dish as TV is today.

Even buried as you are in your satellite TV world, you have probably heard that anything to do with "Internet" and "Web sites" has gone berserk on the world's stock markets. Firms with web or Internet sounding names, listing on the major stock exchanges, are watching their stock climb by 200, 300, 400% in a single week. The BIG money people have decided there will someday be huge profits connected with providing some aspect of Internet service. And their stocks are the wild cards of the new century.

Satellite TV programmers - the Sky New Zealands, Austars, Foxtels of the world - are hardly immune to this gold rush. Some firms such as Sky NZ believe that if their own future is already sound, they can add an extra layer of "stock value" by climbing into corporate bed with an up and coming Internet firm. (1) Others such as Austar believe they can best capitalise on the intensive interest in Internet by somehow configuring their satellite TV delivery system so that it includes a method of delivering Internet.

The satellite TV programmers have decided they will improve their satellite TV uptake by offering consumers more than just satellite TV. England's BSKyB, a prime example, announced in May that they will give - *free of charge* - a BSKyB Digibox IRD and complete home satellite system to each and every home in the UK. Don't be confused - this is not Austar saying they have a "special" on this week and if you sign-up today they will install an Austar system for A\$49.95. BSKyB is actually transferring title - giving ownership rights - to every consumer who wants a "free Digibox satellite system." Now if that seems like a pretty impressive way of building subscribers for BSKyB - there is more. The same homes are *also* getting a free connection to Internet that includes a free Email service and host of other features. All for being a BSKyB TV subscriber. And there is more. The homes *also* receive a 40% discount on their telephone calls through BT - possible because News Corp (BSkyB) has set itself up as a "telephone company" as well.

Sky NZ, Austar, even Foxtel look at this marketing ploy with envy. BSKyB has set itself up as a "one stop shop" for virtually every form of consumer communications - television + Internet + telephone. Austar is this month placing 20% of the firm's stock into public hands and should realise A\$372 million from the sale. This new money is largely earmarked to allow Austar to become an Internet service provider. Existing IRDs will be upgraded (changed out) for new ones with telephone modems on board and software making it possible for subscribers to download, through satellite, Internet data at speeds as high as 400 kilobits per second. For Austar this is a win-win situation: The public rushes to buy their stock (the 20% on offer was

1/ By purchasing an initial 30% of Internet firm IHUG, holding an option to acquire an additional 15%, Sky NZ is set to consummate a technical and marketing marriage that will help Sky stay ahead of any possible late-starting competitors.

essentially sold before it went on sale), and the hype of expanding into the Internet delivery world further drives the stock upward in value.

For Sky NZ, just *purchasing* an interest in IHUG made Sky's stock more valuable. For Austar, just *promising* to deliver Internet to subscribers is all that was required to sell their stock out.

Even TARBS, the ethnic-targeted Australian service launching this month, felt compelled to release a statement clarifying its plans for Internet." We are negotiating with Internet providers to add this service to our package."

If you can't include Internet somewhere in your corporate name, then at least get it into your corporate press releases. If you can't get it into your press releases, get your picture taken and published in front of a PC. Anything is fair in love, war and the hyping of a stock to the public's purse.

Just as BSKyB is offering free Digibox dish systems in the UK (the only up front cost to recipients is a 40 pound installation fee), so too are Internet Service Providers (ISPs in the trade) also now offering free home PCs to consumers. If a home agrees to be a contracted customer of the ISP for its Internet and Web access service for a period of time (typically 2 to 3 years), the home PC (with modem, printer, Windows 98 - typically a nice system) is "free." Coop's Technology Digest for July 6th reports Australia-New Zealand retailer Harvey Norman plans "free PC systems" within a few months.

Why give a PC or a Digibox away? Because Internet firms like pay-TV programmers build corporate value - their stock becomes worth more - as a direct function of the number of subscribers they have. If giving away Digiboxes, and giving away home PCs gets more customers - sooner - the value of their stock (whether privately held or publicly traded) goes up faster.

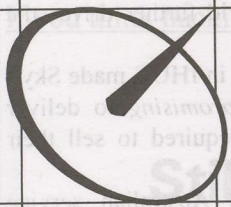
A pay-TV customer (each home) has a corporate value between US\$2,000 and US\$3,500 based upon recent sales of pay-TV firms. When BSKyB gives away a US\$800 dish system they consider that a "cheap way" to have their corporate value go up by no less than \$2,000. An ISP's customer likewise is worth more to the corporation than the A\$300 it might cost to give the new customer a home PC system. Austar obviously hopes that by the time it gets around to actually implementing "Internet via satellite" it will be able to add the two numbers together: say \$2,000 for the customer's pay-TV service and \$800 for the Internet service. That's an instant increase in "corporate value" of 40% in return for delivering Internet to subscribers.

Remember - the individuals at these firms making this complex decisions are only interested in one thing - their personal stock portfolio. If they make wise decisions that enhances the value of their corporate stock, they are deemed good and successful corporate managers. And richer.

A few thousand hackers don't get their attention because they are in the game for much bigger stakes. If you really want to grab their undivided attention, do something that results in publicity that threatens their stock's value.

The TARBS Game

Suggestions that "ethnic television" could be as major part of the Australia / New Zealand satellite TV world date back to the very first issue of SatFACTS; 59 months ago. In those five years we have seen one-off ethnic programmers come and go with great regularity. Studies of the ethnic make-up of each



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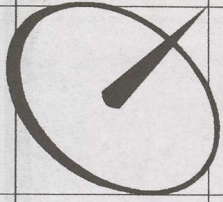
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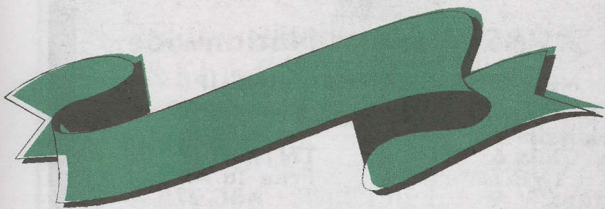
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- CALAMP KU BAND 1dB HIGH STABILITY LNB
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- CALAMP MMDS INTEGRATED ANTENNA

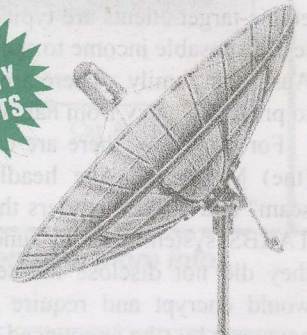
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country have revealed repeatedly there is a combined market of close to a million homes based upon émigrés to both countries who still harbour significant root-ties to their country of origin.

Ethnic TV has been badly offered and badly priced from the outset of its availability through Australian distributors. \$25 a month for a single channel borders on robbery and considering that the actual programming is often free of charge to the distributor, the fees are self defeating. By comparison, Foxtel and Austar "extra packages" (tiers) of as many as 8 channels sell for under \$10 a month.

What these badly priced products have done is drive people to free to air services, with all of their attendant problems. In Melbourne a person interested in Ethnic TV can take home a DIY (do-[install]-it-yourself) package of (analogue) equipment of under \$800. A digital receiver typically adds \$400 to the price tag.

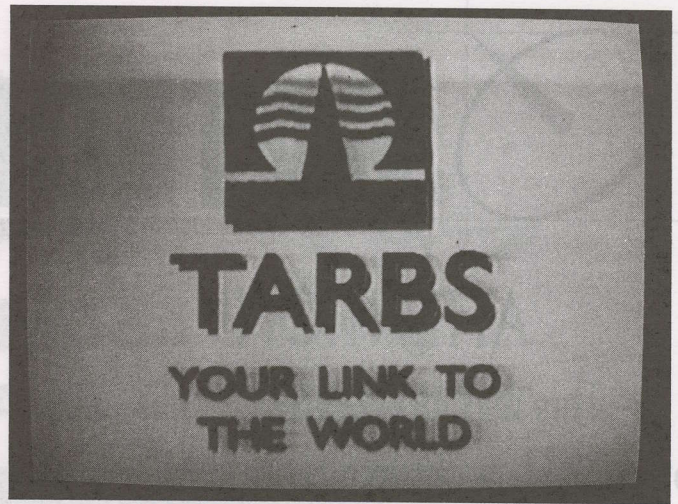
TARBS has been uncertain of their own pricing, has released numerous "balloons" with pricing attached to gauge public reaction, and most of these have been shot down. As SatFACTS goes to press, A\$250 is the installation price for a MDS/MMDS package of equipment; \$795 for a satellite system. The actual *monthly* pricing seems to bounce up and down by the day and if one were to fault TARBS to date it would be for being indecisive about the pricing of their service.

If there is a weakness in the TARBS offering, it is that most subscribers will be only interested in one language channel; the service that speaks their native tongue. To make this "go down" easier, TARBS has tried to inflate the packages with a handful of English language services; CNNI and TNT/Caroons for a start. In the typical case, a subscriber ends up with those two English language services plus the ethnic service of their choice (see screen list to right). The package of "three channels of interest" should be selling for no more than \$9.95 per month. They are not.

TARBS reports appearing in Australian press relate the owners have sunk "up to A\$60 million" in the project to date. That is before they begin spending US\$500,000 per month for the PAS-8 Ku transponder. Elementary math reveals TARBS will need 40,000 subscribers (give or take a few) using the PAS-8 spectrum just to break even on the transponder costs. And that is highly unlikely.

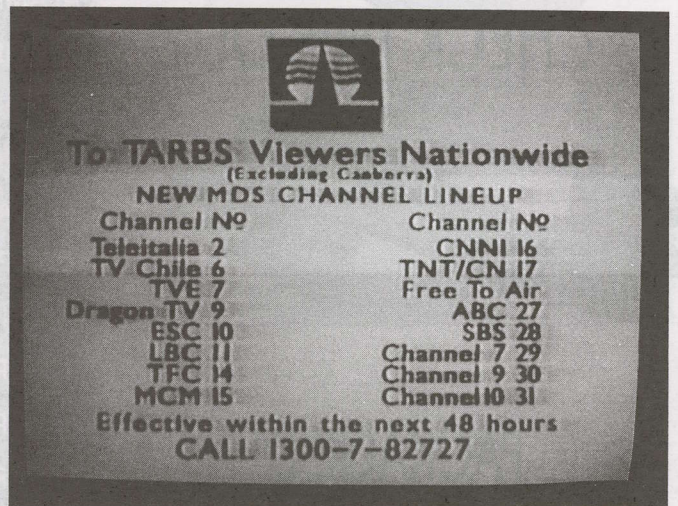
In the best case TARBS is a risky enterprise. Moreover, their ethnic-target clients are typically lower wage earners and have less disposable income to spend for ethnic TV than the average Australian family. There are some significant challenges here to prevent Galaxy from happening a second time.

For right now, there are cautions. The June 24th edition of (the) Melbourne Age headlined a report, "Ethnic pay TV scam" and warned readers that anyone offering to sell them a TARBS system (late in June) was being less than honest if they did not disclose the service available in a test format would encrypt and require a special receiver and monthly payments by (the announced date of) July 15th. It seems some less than Boy Scout equipment sellers and installers were offering "free ethnic TV reception" to people who would buy their systems. Now that July 15th is upon us, all we can do as an industry is watch carefully how well it is accepted by



Television and Radio Broadcasting Services wants to become pay-TV provider to Australia's ethnic population.

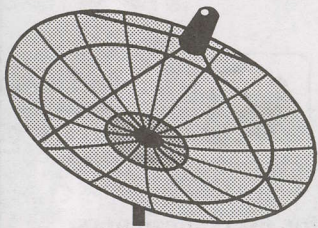
Assets: one satellite transponder on PAS-8 and the ex-Galaxy 2 GHz MDS/MMDS terrestrial microwave network.



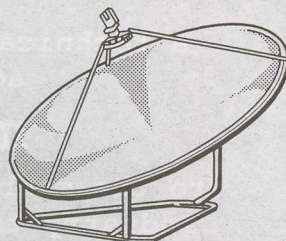
Are all of the TARBS service channels announced pre-cleared with the network originators? Are they legally bound to obtain permission before rebroadcasting? More questions than answers.



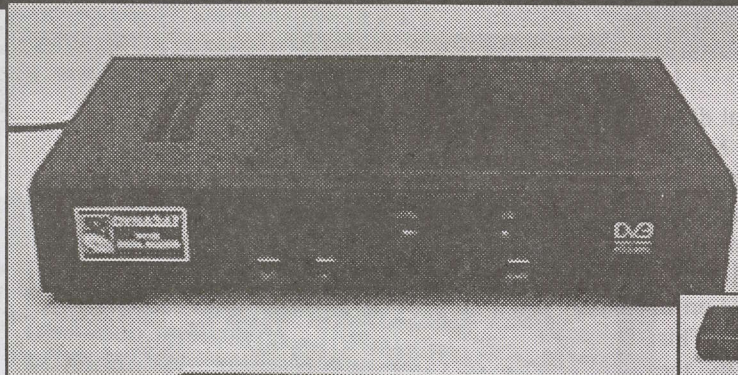
consumers and at what point it becomes a "real player" in the pay-TV game. Ethnic TV sales in Australia remains a challenge for dealers and installers - TARBS is unlikely to improve the situation.



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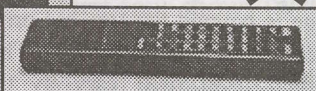
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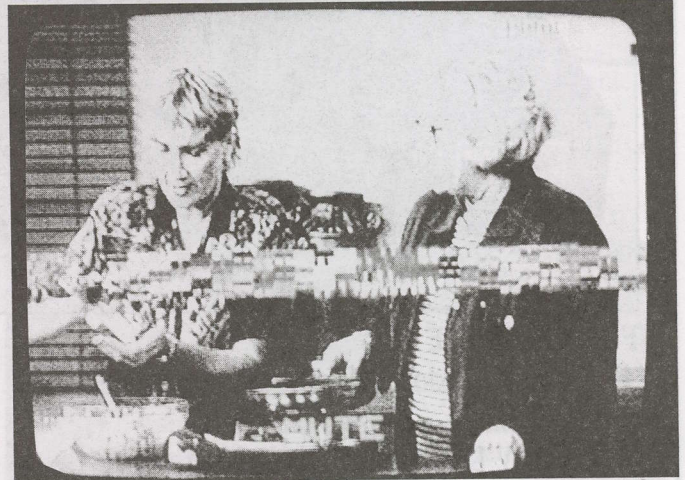
The world of fractional dBs

Although SatFACTS visited the subject of "fractional dBs" as it relates to digital TV reception as early as our March 1995 issue and published some ground breaking photos of the threshold point (versus pixelation) of digital signals, the topic rarely receives proper printed study. There are good reasons.

Digital image "break up" begins with occasional "hits" where some portion of the image is beyond the forward error correction capabilities of the receiver. See photo to right. This precise point, in terms of signal level, will vary by the parameters of the transmission service (FECs of 1/2 are far more 'corrective' than FECs of 7/8; see SatFACTS April 1999, p. 6). And minute differences in the "sensitivity floor" of the IRD will also have an impact on the point where pixelation starts. Moreover, in a "dynamic bandwidth" system where the uplinker varies the information data rate (such as between 5 and 12 Mbps) as a function of the on screen video content, the actual point of threshold can also change in a less than carefully designed receiver.

In the trade, the "edge of digital reception" is termed "the cliff effect"; just a few tenths of a dB less signal power and the reception "falls off the cliff." Cliff effect is a way of life for all digital transmission formats including the newly launched terrestrial digital (DTT) in the UK and USA. As we have noted many times previously, with digital you either have perfect reception (no glitching or pixelation), or, you have no reception. In theory, there is almost no grey area that exists between "perfect" and "none."

Because every installation varies (a function of the transmission parameters at the moment of measurement and the particular set of equipment being used for reception), it is difficult - some would suggest impossible - to have totally hard and fast "rules of thumb" to provide an answer to the important question:



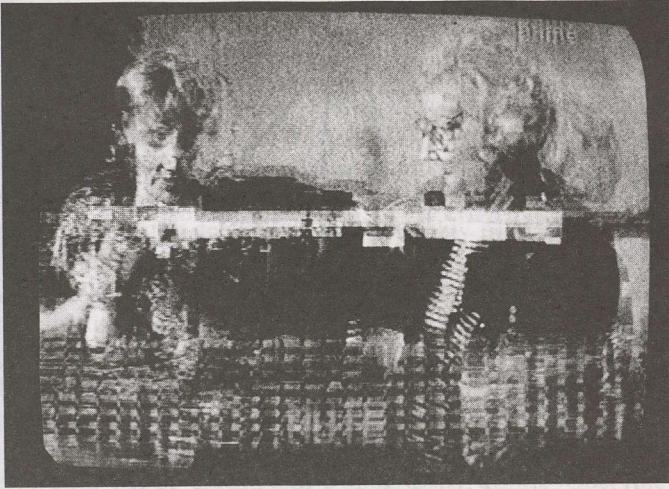
Threshold minus 0.2 dB (above),
threshold minus 0.4 dB (below)



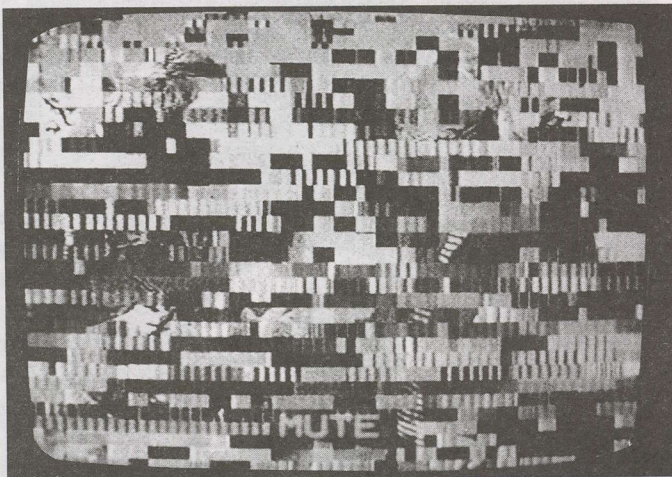
MEMBERSHIP IN SPACE

Membership in SPACE Pacific is open to any individual or firm involved in the "satellite-direct" world in the Pacific and Asia regions. There are four levels of membership covering "Individuals," the "Installer/Dealer," the "Cable/SMATV Operator," and the "Importer/Distributor/Programmer."

All levels receive periodic programme and equipment access updates from SPACE, significant discounts on goods and services from many member firms, and major discounts while attending the annual SPRCS (industry trade show) next March. Members also participate in policy creation forums, have correspondence training courses available. To find out more, contact (fax) 64-9-406-1083 or use information request card, page 34, this issue of SatFACTS. Page space within SatFACTS is donated each month to the trade association without cost by the publisher.



Threshold minus 0.6 dB (above),
threshold minus 0.8 dB (below)



"How much headroom" do we have here?

The answer is that if you are experiencing occasional (as in once every 5 minutes) pixelation, you are probably operating with less than 1 dB of headroom. At C-band. If this is a Ku-band test, and the signal is pixelating because of changing climatic conditions above the receiving site (moisture laden clouds floating by), the headroom between "clear skies" and "overcast" or "rain" is probably more than a dB but not much more.

In the four photos shown here, we have installed a precision 0.1 dB step attenuator in the L-band input line to a Scientific Atlanta D9223 IRD. To get these four photos we shot several rolls of film and video recorded the measurements to ensure that when the film was developed we knew precisely what we had done.

As you can quickly see, in 0.2 dB steps the pixelation goes from threshold (a photo that would precede the first photo shown) through various stages of degradation. Between absolute threshold and total pixelation we measured 0.8 dB. This was a bit of a surprise as we had anticipated the "grey" area would be closer to a 0.4 or 0.5 dB window.

But there is this caution. On a different format signal (this was a SCPC service with an FEC of 2/3) and as observed through a different brand, model or design of IRD, the "grey area" window will certainly change.

So if you have occasional pixelation - how close are you to the edge of the cliff? Too close - especially if your input is a Ku-band signal and the skies are clear at the time of measurement.

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"Is now my default Web site; updates make it almost 'live'." (WA) *"Like having SatFACTS every day - WOW!"* (Fiji)

SPACE Pacific Report

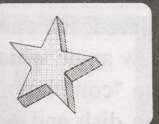
Weekly television programme (one hour) produced in New Zealand by SPACE, aired by KIBC on As2 and SPN on Intelsat 1701.

Update:

First four shows (will run first 8 weeks) being delivered to TV broadcasters as you read these words; schedule of when they will be broadcast will be posted on

<http://www.satfacts.kwikkopy.co.nz> as soon as verified by broadcasters. For those who can't "see" KIBC and/or SPN, tape dub copies available in August SatFACTS.

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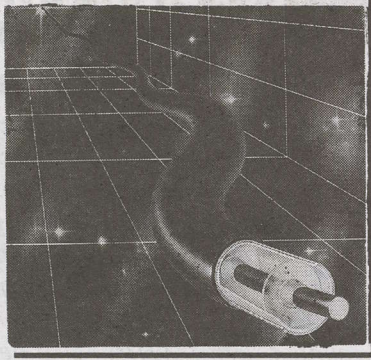
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The CABLE Connection



Precision dish/feed alignment

Virtually any prime focus dish can be mis-assembled (or poorly designed) so that the parabolic surface ends up "splattering" the intercepted energy to a broad space out in front of the dish - rather than to a precise "focal point." There are a number of techniques for verifying the correct shape of the dish and being certain the feed is located at that "focal point."

This method assumes you have a way to look through the dish from behind the surface by placing an eyeball up against the dish and looking through a hole that has been conveniently left there or drilled there during installation. This "alignment hole" is a sighting tool - it allows you to "eyeball" the dish + feed after assembly to see that the feed is squarely and properly located at the mechanical centre of the dish surface. And, that the feed is pointing straight back at the dish center and not off at some cocked angle.

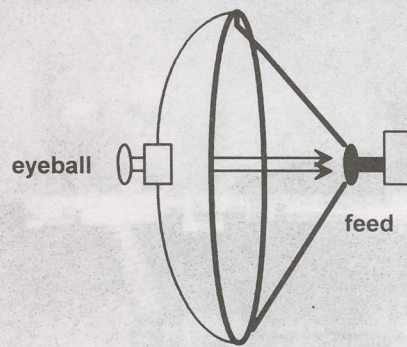
The prime focus dish functions based upon reflection. Energy from the satellite strikes the parabolic curved surface and is reflected (bounced) backwards. Because the surface is curved, the energy striking the dish surface reflects away at a new angle which correlates to the curved surface angle (called the "complimentary angle"). The only place the energy strikes the dish and bounces back in the same line as it came to the dish (retracing precisely its inward bound path) is at the very centre of the dish. Here, the parabolic reflector surface is at right angles to the incoming wave and the reflection direction is turned around 180 degrees from the incoming path.

The focal "point" will, with a properly shaped and formed prime focus dish, be at the exact centre of the dish some distance "backwards" from the dish surface. Problem one: How can you locate the exact centre of the dish, accurately?

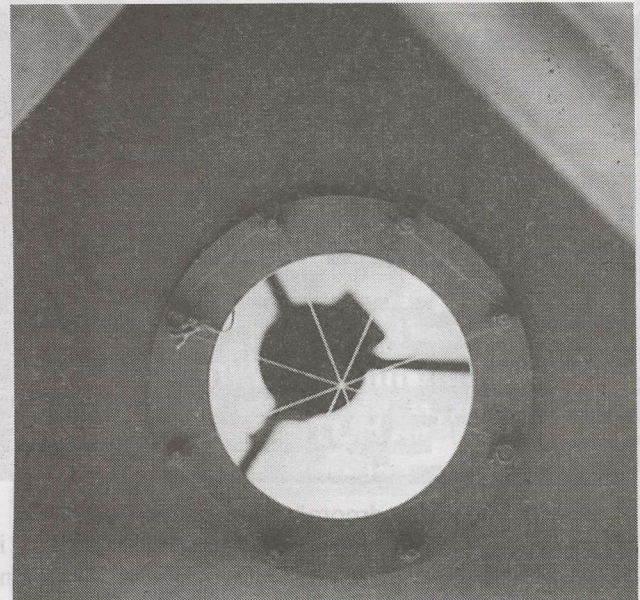
The answer is deceptively simple. Take a roll of white string and attach one end at the precise 12 noon (top centre) of the dish's outer surface. Now go to the 6 o'clock position on the dish, pull the string tight and anchor it there. Repeat this process with new strings running from 2 o'clock to 8 o'clock and 4 o'clock to 10 o'clock. Now we have three strings in place and they will cross one another at the centre of the dish!

Suppose the cross point is not a point at all? That two strings cross at one point and another two at another point? What does that mean? Simply that your parabolic dish is not parabolic (or that you have been careless in running the strings). Step two - readjust the mechanics of the dish assembly so that all three (or more if you use more than 3 - which is a minimum) cross at one single point; the centre of the dish.

Having located the centre of the dish, step two (or three) is to install the feed using its support parts. Temporarily arrange



By looking through exact centre of parabolic dish, at feed, alignment between the (pin prick) hole in the centre of the dish and the centre of the feed can be visually sighted.



Think of this exercise as aligning cross hairs on a gun sight. Four (white in photo) strings have been drawn taut across the front of the dish (see text) to create an obvious "cross point" in the centre of the dish parallel to the dish rim. Two (grey) strings have been crossed tautly over the opening to the feed. When the feed is properly "centred" (aligned) with the dish centre (focal point) both sets of "crosses" will align visually to an eyeball positioned at the rear of the dish looking through the centre hole.

a set of new strings as cross hairs from 12 o'clock to 6 o'clock and another from 3 o'clock to 9 o'clock on the feed mouth.

Now, if your dish has a hole in the centre of the parabolic surface (in the middle of the "deepest point" on the dish) get an eyeball behind the dish, look through the hole and see if the cross hair strings on the dish precisely align with the cross hair strings on the feed. (See photo above.)

What we have here is a three part alignment tool; the hole in the dish centre, the cross hairs the mark that centre of the parabolic surface and the cross hairs marking the centre of the feed. If all three align to a precise point (the feed cross hairs fall exactly behind the dish cross hairs), tighten everything up.

If the feed centre is not exactly behind the dish centre, readjust the feed mounting system until the two do align.

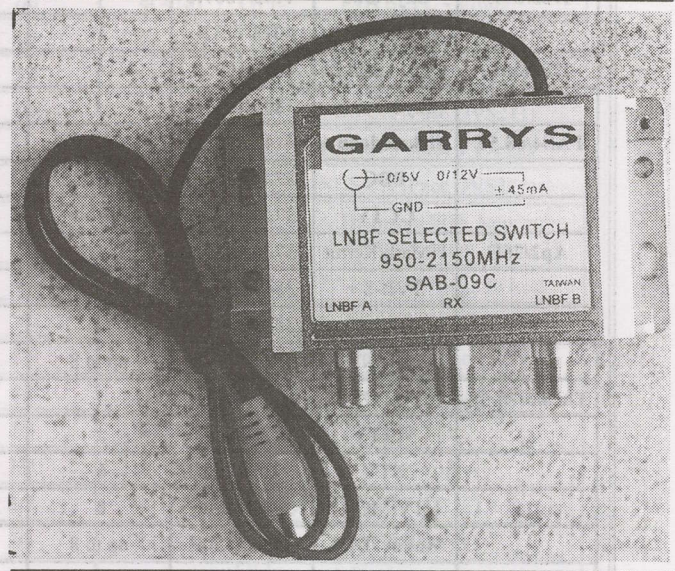
Dishes that go together in sections (i.e. they are not one piece reflectors) have many while-being-assembled opportunities to get out of "whack"; to end up being warped or something other than parabolic in shape. The cross hair strings you run across the dish surface will quickly be your "proof of performance" test for proper dish assembly even if you have no way to get behind the dish and sight the cross hairs. You don't have to be looking through a centre hole to quickly see the dish is "out of shape" and usually by loosening up some panels, ribs or both you can push and shove until the cross hairs fall into alignment (they all cross at the precise same point).

There are two rules of thumb which all installers should remember when assembling prime focus dishes. One, the greater the number of parts to be assembled, the more likely the dish will end up being something other than truly parabolic (or - a one piece dish - if it has not been damaged is the best choice). Two, the larger the dish, the more likely it will end up being out-of-parabolic. An 11 metre dish with huge panels and lots of parts often requires as many days to "true" (get into a perfect parabolic shape) as it does to assemble. (and this is done with the help of an instrument called a Theodolite).

The "tolerance" or margin for error in even a 3m dish is sufficient to cost you 2 dB just by being less careful than you might have been during assembly. Add to that another 1 to 2 dB of "loss" created by a feed that is slightly off centre, cocked to the side (not pointing at the centre of the dish) - or both, and you have a 3m dish that works like a 2m dish. Or worse. Brands such as the "Perfect Ten" seem to have more gain for a simple reason; they go together more accurately.

Quick switch trick

Every installer should have a "spare parts box" that includes push-on F connectors (you don't know what they are? Watch SPACE Pacific Report show 9904!), amalgamating tape, and a switch like the one show here.



Why? To allow you to quickly switch between IRDs, feeds, antennas, test equipment pieces. A 0 (to 5V) or 12V (+) switching voltage - always available at an IRD, spectrum analyser, even a pocket battery in an emergency - allows high isolation, 75 ohm impedance selection of either of two inputs. A cable system could even switch between IRDs driven by a hardware store timer to change video sources. Get one (AV-COMM Pty Ltd) and discover new uses yourself!

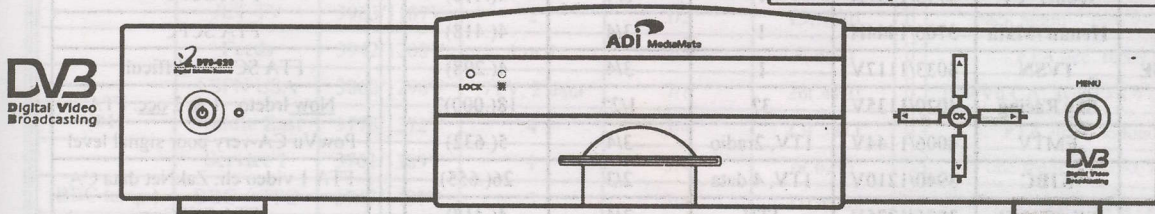
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SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 July 1999

BIRD	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	
I703/57E	Sky News	4143/1007R	1	3/4	5(.632)	
	CNBC	4018/1132L	1	3/4	6(.000)	
I704/66E	TV5. Adult 21	4055/1095R	4	3/4	27(.500)	
	Sky News +	3805/1345R	4	3/4	22(.520)	
PAS4/68.5E	Nickelodeon +	4147/1003H	1 reported	1/2	24(.000)	
	BBC	3743/1407H	5	3/4	21(.800)	
	CCTV	3716/1434H	up to 6	3/4	19(.850)	
Ap2/76E	HMark/Kermt	3720/1430H	4	5/6	29(.270)	
	TVB-8 +	3849/1301H	4	3/4	13(.238)	
	Disney	3880/1270H	3	5/6	28(.125)	
	AXN	3920/1230H	up to 8	7/8	28(.340)	
Them3/78.5E	ITC	3569/1581H	1	3/4	10(.200)	
	MRTV	3666/1484H	1	2/3	4(.442)	
	UTV	3920/1230H	6	3/4	26(.662)	
	UTV/MCOT	3880/1270H	8	3/4	27(.500)	
	Mahar./DD1	3600/1550H	up to 8	3/4	26(.662)	
	Myanmar TV	3666/1484H	1	3/4	4(.442)	
	TV Maldives	3412/1738V	1	1/2	6(.312)	
	Thai Global +	3425/1725V	up to 7	2/3	27(.500)	
	As2/100.5E	Euro Bouquet	4000/1150H	6TV, 12r	3/4	28(.125)
		Hubei/HBTV	3854/1296H	1	3/4	4(.418)
Hunan/SRTC		3847/1303H	1	3/4	4(.418)	
Guan./GDTV		3840/1310H	1	3/4	4(.418)	
Inn Mongolia		3828/1322H	2	3/4	4(.418)	
Saudi Arabia		3811/1339H	1	3/4	3(.905)	
APTN A-O		3799/1351H	1	3/4	5(.631)	
WTN Jer/Lon		3790/1360H	1	3/4	5(.631)	
Reuters/Singap		3775/1375H	1	3/4	5(.631)	
(off air???) Reuters M-E		3770/1380H	1	3/4	5(.632)	
WorldNet		3764/1386H	1 + 20 radio	3/4	6(.100)	
Liaoning/Svc2		3734/1416H	1	3/4	4(.418)	
Jiangxi/JXTV		3727/1423H	1	3/4	4(.418)	
Fujian/SETV		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)	
As2/100.5E		TVSN	4033/1117V	1	3/4	4(.298)
		Sky Racing	4020/1135V	3?	1/2?	18(.000)?
		EMTV	4006/1144V	1TV, 2radio	3/4	5(.632)
		KIBC	3940/1210V	1TV, 4 data	2/3	26(.655)
	Jilin Sat Ch	3875/1275V	1TV	3/4	4(.418)	
	HeiLongJiang	3834/1316V	1	3/4	4(.418)	
	JSTV	3827/1323V	1	3/4	4(.418)	
	Anhui TV	3820/1330V	1	3/4	4(.418)	
	Shaanxi/QQQ	3813/1337V	1	3/4	4(.418)	
	Guang GXTV	3806/1344V	1	3/4	4(.418)	
	Fashion TV	3796/1354V	1	3/4	2(.533)	
	Feeds	3785/1365V	1	3/4	5(.632)	

Receivers and Errata
NDS encrypted: often FTA
Feeds-FTA SCPC
FTA (Adult 21 off air???)
Sky News 24 hr. sport. feeds FTA?
Ws testing FTA - still active???
FTA: 2 audio channels?
FTA
PowVu typ CA
PowerVu CA
PowVu CA
Tests, promos, some FTA
FTA
FTA: difficult to load
Irdeto CA
Irdeto CA
FTA (Indian, Skai-TV)
FTA - may be only test
FTA (seen Australia)
FTA
FTA (TV5 teletext)
FTA SCPC. teletext
FTA SCPC. teletext
FTA SCPC: radio APID 81
FTA - #1 Chinese. #2 Mongolian
FTA SCPC - "Ch. 1"
FTA SCPC
Mostly CA SCPC. some FTA
Some FTA SCPC
Some FTA SCPC
FTA, multiple radio channels
FTA SCPC
FTA SCPC: teletext
FTA SCPC
FTA SCPC
FTA SCPC
FTA SCPC - difficult
Now Irdeto: 1 & 3 occ. FTA
PowVu CA-very poor signal level
FTA 1 video ch: ZakNet data CA
FTA SCPC
FTA SCPC
FTA SCPC
FTA SCPC
FTA SCPC
(remains) FTA-difficult to load
Was Eastern TV - now SCPC feeds

BIRD	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(As1-cont)	Myawady TV	3766/1384V	1	7/8	5(.080)
As3S/105.5E	Arirang TV	3755/1395V	1	7/8	4(.418)
	Star TV	3780/1370V	17TV?	3/4	28(.100)
	Star TV	3860/1290V	14 TV	3/4	27(.500)
	Star TV	3880/1270H	12TV	7/8	26(.850)
	CNNI	3960/1190H	4(+?) TV	3/4	26(.000)
	Star TV	4000/1150H	7TV	7/8	26(.850)
Cak1/107.1E	Indovision S-band	2.536, (.566, .596, 2.626)	33+	5/6	20(.000)
Sinoat 1/110E	Shanghai	4106/1044V	1	2/3	4(.443)
C2M/113E	C-Net Taiwan	4000/1150H	11	5/6	21(.095)
	Mega TV	3780/1370V	5?	3/4	27(.500)
	C Net Taiwan	3760/1390H	11TV, 10 r	5/6	21(.091)
	RCTI	3475/1675H	1	3/4	8(.000)
JcSat3/128E	NK-J	3990/1160V	1	1/2	6(.100)
LMI API/130	THT	3725/1425L	1 (PAL format)	3/4	6(.108)
API/138E	Taiwan Bqt	3800/1350H	up to 8	3/4	26(.697)
	Laos Nat. TV	3924/1226V	1	3/4	2(.522)
	CNNI	3980/1170V	4	3/4	26(.000)
Optus B3/156	Aurora	12.595..720V	17+, 21+ rad.	3/4	30(.000)
	Aurora	12.407.532V	17+, 21+ rad.	2/3	30(.000)
	Austar/Foxtel	12.438(.564, .626, .688)	45+TV, 12 radio	3/4	29(.473)
Optus B1/160	Sky NZ	12.391(.418)V	19+TV	3/4	22(.500)
	Imparja feed	12.367H	1TV	3/4	5(.424)
PAS8/166E	ABC Interchg	12.332H	1+1+1 TV	3/4	6(.978)
	TARBS	12.524H	10(+TV)	3/4	28(.062)
	NHK Joho	4065/1085H	5 TV, 1 radio	3/4	26(.470)
	Cal Bqt/PAS8	3940/1210H	4 or 5 TV	7/8	27(.690)
	CNN	3780/1370H	3 up to 5	3/4	25(.000)
PAS-2/ 169E	GWN Perth	12.265V	4TV, 7 radio	1/2	16(.200)
	Telstra Bend.	12.300V	2	1/2	21(.997)
	Unknown	12.436H	4	3/4	20(.553)
(#2)	HK PowVu	4148/1002V	up to 8	2/3	24(.430)
(#3)	NBC HK	4093/1057V	5 typical	3/4	29(.473)
	JET-TV	3963/1187V	2	1/2	13(.740)
	Feeds	3942/1208V	1 or 2	2/3	7(.497)
	ESPN USA	3860/1290V	7TV, 2 data	7/8	26(.470)
(#4)	Middle East	3778/1372V	4	3/4	13(.331)
	Service 1	3761/1389V	1	3/4	6(.620)
(BBC temp)	BBC + TFC	3743/1407V	5	3/4	21(.800)
(#5)	CCTVPowVu	3716/1434V	5 typical	3/4	19(.850)
	TCS-Singap.	4183/967V	2	1/2	6(.620)
	NTV Japan	4174/976H	1	3/4	5(.632)
	Feeds	4138/1012H	1	3/4	6(.620)
(#7)	NHK Joho	4035/1115H	5TV, 1 radio	3/4	26(.470)
	CNNI HK	3996/1154H	1TV	3/4	9(.998)
	Feeds	3967/1183H	1+	2/3	6(.618)
	7th Day Adv.	3957/1193H	1, 14 audio	3/4	7(.000)
	PAS-2 feeds	3939/1211H	2 (NTSC)	2/3	6(.620/7.498)
(#8)	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)

Receivers & Errata
FTA SCPC - difficult
FTA SCPC - strong!
NDS CA (Pace DVS211)
NDS CA (Pace DVS211)
NDS CA (Pace DVS211)
PowerVu-some FTA chs
NDS CA (Pace DVS211)
RCA/Thomsom IRD. Now more dependable operation: see p. 31
FTA SCPC-difficult to load
#s3-10 FTA. #5 adult porn
unknown encryption format
all TV now CA but subs available
FTA SCPC
Unknown/CA?
typ. 0500-2100UTC. FTA Russian
FTA MCPC
FTA SCPC
CNN FTA
CA, \$50 smart card required
CA, \$50 smart card required
DGT400 CA except FTA TVSN and radio
NDS CA, 12.391 primary
backhaul feed/ hard to load
+12.324, .315 (was PAS-2 Ku)
CA announced for July 15
ICA (D9234).. 4 FTA
mixed CA + FTA (EWTN)
PowVu. temp FTA
PowVu CA (D9234)
PowVu typ. CA (D9223 only)
testing, no audio. int. video
PowVu, mostly CA. some FTA
Philips mux format FTA
back again - PowVu CA
FTA occ. feeds
PowVu CA: avoid #8.9 w/9223'
FTA -hard to load
occ feeds. FTA SCPC
PowVu: CA and FTA (BBC#3)
FTA (# pgm chs varies)
PowVu FTA/snews ch coming
FTA SCPC feeds (occasional)
FTA SCPC
1 CA (D9234). 4 FTA to 31/05/99
FTA - occasional feeds
FTA - World Cup Cricket
1900-2030UTC. not daily
FTA (NBA . shuttle-typ NTSC)
Some CA. some FTA (NTSC)

SatFACTS Digital Watch: Supplemental Reference Data / July 1999

PAS-2/169E	Disney	3804/1346H	3	5/6	21(.093)
	Discovery Sing	3776/1374H	8	3/4	21(.093)
	Satcom 1-6	3743/1407H	5	7/8	19(.465)
I702/177E	AFRTS	4177/973L	8TV, 12r.+	3/4	26(.694)
inactive?	Thai Bouquet	12.650H	up to 3 TV	1/2	17(.800)
I701/180E	TVNZ Gennet	4195/955R	1 (CA)	3/4	5(.632)
		4186/964R	BBC/Gennet	3/4	5(.632)
		4178/972R	1 (CA)	3/4	5(.632)
		4170/980R	APTN-Tokyo	3/4	5(.632)
	AFRTS Pac.	4175/975L	3 radio	2/3	3(.679)
(#9)	RFO-Canal+	4095/1055L	7TV, 5+ radio	3/4	27(.500)
	SPN Nauru	4081/1069R	1	3/4	4(.730)
	NZ Prime TV	4024/1126L	1	2/3	6(.876)
	RFO Polycast	3858/1292L	1	3/4	4(.566)
	TVNZ TL	3854/1293R	1	3/4	5(.632)
	TVNZ	3856/1294R	1	3/4	5(.632)
	TVNZ	3846/1304R	1	3/4	5(.632)
	10 Australia	3765/1385R	6	7/8	29(.900)

PowVu (D9234) CA
PowVu (D9234) CA
currently Middle East (4 chs)
PowVu (D9234) CA
FTA, replaced Space TV
DMV/NL CA. all channels occ. use. FTA irregular around special event coverage
PowVu. CA audio (3 chs.)
Canal + (2) CA. rest FTA
FTA SCPC: weak signal
PowVu CA: network feeds
East hemi beam to Tahiti
SCPC mixed FTA. CA feeds
SCPC mixed FTA. CA feeds
SCPC mixed FTA. CA feeds
PowVu CA: #5,6 occ FTA

Bouquets: MCPC (multiple [program] channels per carrier) MPEG-2 content frequently changes. Primary FTA (free to air) MCPC bouquets are as follows: 1) European Bouquet: (1) **Deutsche Welle**, (2) **MCM**, (3) **RAI International**, (4) **RTVE** (Spain), (5) **TV5 Paris** + up to 17 radio (some stereo) - see p. 2; 2) Hong Kong PowVu: (5) **Ad Hoc NTSC feeds**, (6) **Ad Hoc PAL feeds**: (3) **NBC HK** (Hong Kong): (1) **CNBC Asial**, (2) **CNBC Australia**, (3) **National Geographic** [English], (4) **CNBC India**, (5) **National Geographic** [subtitled Taiwan], (6) **Occ feeds**, (7) **CNBC test card-feeds**: (4) **Middle East** [testing]: (1) **Antenne 1**, (2) **Lebanon LBC**, (3) **ART Australia**, (4) **RAI Australia**; (5) **CCTV PowVu**: (1) **CCTV4**, (2) **CCTV3**, (3) **CCTV 9**, (4) **test bar**, (5) **CCTV1**; (7) **NHK JoHo**: (1) **NTSC Japanese**, (2) **NTSC English**, (3) **PAL Japanese**, (4) **PAL English**, (5) **NHK Radio**, (6) **NHK Premium**; (8) **Cal PowVu**: (1) **CMT** [NTSC] (CA 01/07), (2) **Ad-hoc/CBS** [NTSC], (3) **BBC** [NTSC], (4) **NMAPA card, feeds**, (5) **Ad hoc feeds**, (6) **Bloomberg Financial** [NTSC], (7) **Golf Channel** [NTSC], (8) **MTA**; (9) **RFO-Canal+**: (1) **Canal+** [Polynesia], (2) **Canal+** [New Caledonia], (3) **test**, (4) **test**, (7) **TOM1**, (10) **TOM2**, (13) **TOM3** + radio on 5,6,8,9,11,12,14,15.

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

ADI MediaMate. FTA. NTSC-PAL outputs. (Pacific Digital Sys. Pty Ltd, tel 61-2-8765-0270)
AV-COMM R3100. FTA, excellent sensitivity (reviewed SF May 1998). Av-Comm Pty Ltd., tel 61-2-9949-7417
Grundig DTR1100. Mfg by Panasat S. Africa, similar to Panasat 630; out of production. Irdeto capable (see AV-Comm. above)
Hyundai-TV/Com. HSS-100B/G (Pacific) and HSS-100C (China) FTA. Versions 2.25/2.26 good performers. 3.11 later offered and those with Nokia tuners good performers. Version 5.0 not so good. SATECH ([V2.26] 61-3-9553-3399), Skandia ([V3.11] 61-3-9819-2466).
Hyundai HSS700. FTA. PowerVu. search, SCPC/MCPC. (Kristal Eletronics 61-7-4788-8906) [review March99]
MediaStar D7. FTA. preloaded with known services, exc. software (review SF July 1998). MediaStar Comm. Int. (61-2-9618-5777)
Nokia "d-box" (V1.7X). European, FTA, typically German menu, capable of "Dr. Overflow" Internet updates. Caution on this one!
Nokia 2000S (Asia/Pacific). Released Oct. 1998; equipped with CAM/PCMCIA slot, capable of Irdeto, others (factory will NOT supply CAMs at this time); no Asia-Pacific sources known at this time (but readily available through European sources): review 11/98.
Nokia 9200/9500/9600/9800. FTA. factory software does PowVu poorly, but has significant Internet software support. Ultimate play-around hobby machine but not consumer friendly. Original V1.63 had unique ability to search entire satellite to locate and list all SCPC/MCPC services; latest (V5.X software) versions compatible with Dr. Overflow (V8.X) software from Internet. CI (common interface) versions available in Europe can be Irdeto compatible. No Pacific/Asia support; help from Av-Comm (61-2-9949-7417). and software from www.BAKKERELECTRONICS.COM. 9800S single chip released mid-May 1999.
PACE DVS-211. NDS CA only (no FTA); Indovision, Star TV Asia. (Viva, Star News to Aust - Solution 42 61-2-9820-5962)
PACE DGT400. Original Galaxy (now Foxtel Sat/Austar) IRD. Irdeto, FTA with difficulty. (Foxtel Australia 1300-360818).
PACE DVR500. Original NBC affiliate IRD; FTA or Irdeto (w/CAM). Similar to DGT400, more reliable. No sources.
PACE "World Box." (DSR-620) Created for NDS non-DVB compliant MPEG-2, including Sky NZ. Info. ++49-211-526-9833.
Panasat 520/630/635. MCPC FTA. Irdeto capable. Out of production; spares from UEC (fax ++27-31-593-370.)
Panasonic TU-DS10. FTA. Irdeto CA. (see SF Aug. 1998). Aurora, (Evcom 61-2-9316-5055).
Phoenix 111 & 222. FTA. PowVu. Exceptional graphics, ease of use. (SATECH 61-3-9553-3399) (111 review May 1999)
Phoenix 333. FTA MPEG-2, analogue, positioner. Detailed review SF Nov. 1998. (SATECH 61-3-9553-3399).
PowerCom. FTA. PowVu, exc. sensitivity. (NetSat 61-2-9687-9903)
PowerVu /PowVu D9223, 9225, 9234. Non DVB compliant proprietary format capable MPEG-2 FTA with optional software. 9234 sold for GWN and NHK Joho PAS-2, EMTV As2, CA access; others for various CA services. (Scientific Atlanta 61-2-9452-3388)
Praxis DigiMaster 9600 MKII/9800AD. FTA. PowVu + analogue.; (no longer supported in Pacific). was Skyvision - see below)
Praxis 9800 ADP. FTA. PowVu, analogue, positioner. Review December 1998. (no longer supported in Pacific. see Skyvision below)
Prosat 2102S. FTA. NTSC + PAL. SCART + RCA. (Sciteq 61-8-9306-3737)
Samsung DSR2400: FTA. not especially sensitive, newly released in Asia; no common sources.
SatCruiser DSR-101. FTA. PowVu, NTSC + PAL. (Skyvision Australia 61-2-6292-5850; Telsat 64-6-356-2749)
SatCruiser DSR-201P. FTA. NTSC & PAL digital, analogue, positioner. (Skyvision Australia - see above)
SK888. (aka DigiSkan from Sun Moon Star). FTA MCPC. Irdeto CAM capable. (Skandia 61-3-9819-2466)
UEC 642. FTA. Irdeto built-in, for Aurora + Optus DTH. ("Mondec" rack mount industrial version) (Nationwide 61-7-3252-2947)
UEC 660. Aust. Sky Ch. (1 version), Foxtel Aust. (2nd version); (now available for retail users at Nationwide 61-7-3252-2947)
YURI HSS-100C. FTA, rebadged Hyundai V.2.27 software custom to Australia (Nationwide 61-7-3252-2947)

SatFACTS Pacific/Asian FTA ANALOGUE Watch: 15 July 1999

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BIRD / Location	RF/IF & Polarity	Service	Errata	
I703/57E	3760/1390R	Sun TV		
	3808/1342R	Udaya TV		
	3886/1264R	Surya TV		
	3980/1170R	AsiaNet		
	4052/1098R	WorldNet	VOA subcar.	
	4178/972L	MTA Inter.		
I604/602/60E	4166/984	feeds		
I704/66E	3765/1385R	Tests		
	4015/1135L	Mongolia	(SECAM)	
PAS4/68.5E	3743/1407V	RTPi		
	3864/1286V	BBC World		
	3907/1243H	Sony TV	Hindi	
	4034/1116V	Doordan		
	4087/1063H	CNNI		
	4110/1040H	TNT/Cartoon		
	4113/1037V	Series Ch.		
	4182/968H	MTV		
	PAS7/68.5E	3470/1680V	Test Signal	
	Ap2R/76E	3745/1405V	Vasta Music	P5 NSW
3760/1390H		TEN tests		
Thaic3/78E	3871/1279H	TVT		
	3760/1390V	Army TV		
	3690/1460V	MRTV		
	3685/1465H	Mynamar		
	3616/1534V	ETN	(name chnge)	
	3576/1574V	ATN Bangla	Bengali	
	3554/1596V	RAJ Plus		
	3536/1614V	Punjabi TV	unreliable	
	3514/1636V	Falak TV		
	3489/1661H	Vasta Music	tests	
	3465/1685V	RAJ-TV		
	Exp. 6/80E	3672/1478L	TK Rossija	(north only)
	InSat2E/83E	3696/1454V	Teluga	
3808/1342V		AIR-Tamil		
3849/1301V		DD1 National	(intermittent)	
3929/1221V		DD2 Metro	P5 Aust.	
3971/1179V		DD8	Andre Prades	
3998/1152V		sport feeds		
4014/1136V		feeds		
4081/1069		DD7	West Bengal	
ChiStr1/87.5		3875/1275H	occ. feeds	P4 NSW Ntsc
ST1/88E		3550/1600V	test card	
	3582/1568V	Nila TV	(operational)	
CIS S6/90E	3675/1475R	RTR I	P3 NSW	
	3875/1275R	Orbita I		
	3916/1234R	RTR II		
	3935/1215R	Orbita II		

MeSat-1/91.5E	3710/1440H	VTV 1.2.4		
	3880/1270H	RTM-1		
Insat2B/93.5E	4165/985H	India Metro	Aust on 3.7m	
	4125/1025V	Ind. National	Aust on 3.7m	
	4070/1080H	India DD9		
	4080/1070V	DD7 (Tamil)		
	3970/1180V	DD9 (kan.)		
	3882/1268V	India DD1		
	3840/1310V	India DD		
	3762/1388V	India DD4		
CIS-S20/96.5E	3675/1475R	ORT	(this satellite may be out of service)	
	3825/1325R	Madagascar +		
	3875/1275R	Test Card		
AsSat2/100.5E	3642/1508H	ERTU Egypt		
	3660/1490V	Test Card		
	3680/1470H	Feeds/Iran		
	3860/1290V	Feeds #		
	3885/1265H	WorldNet	VOA Subcar.	
	3960/1190H	CCTV4		
	3980/1170V	RTPi	Radio Subcar.	
	CIS S21/103E	3675/1475R	RTR	
		3875/1275R	Vrk Apt	
	AsSat3S/105.5	3760/1390H	CETV	
(temp FTA)		3800/1350H	Star Sports NTSC	
(temp FTA)		3840/1310H	Channel [V] NTSC	
(temp FTA)		3920/1230H	Phoenix Chin. NTSC	
		3940/1210V	Zee India	
		3980/1170V	Zee TV	
		4060/1090V	Zee Cinema	(starcrypt)
	4100/1050V	PTV2/World	0900-2400 PST	
	4120/1030V	CCTV4	NTSC	
PalB2R/108E	4000/1150H	TVRI		
PalC2/113E	4183/967V	TPI/TVRI		
	4160/990H	(France) TV5	poor audio	
	4140/1010V	Brunei, feeds		
	4120/1030H	MTV Asia		
	4080/1070H	Herbalife	2100HK/NTSC	
	4040/1110H	CNBC		
	4020/1130V	ANteve	(left air?)	
	3970/1180V	CNNI	(was 3980)	
	3900/1250V	Malaysia TV3	CA and FTA	
		3880/1270H	Aust. ATN7	
	3840/1310H	TVRI	temporary?	
	3765/1385H	NBC. CNBC	Feeds. Herbalif	
	3742/1408V	RCTI	English subcar	
AsSat-G/122E	3675/1475L	bird moving	to 77.5E	
ChinSat 6/125	4085/1065V	feeds	is it really here?	
G'zont29/130E	3675/1475	NTV (+8hrs)	off 1400 UTC	
Ap1A/134E	3820/1330H	CETV SD		

53.2	55	57	66	68.8	76	78.5	80	87.5	88	91.5	93.5	100.4	103	105.5	107.1	108	110.5	1.103	120	(122)
S27	2DT	1703	1704	PAS4 PAS7	Ap2	Th3	Ex2	Cs1	St1	Me-1	In2B	As2	S21	As3S	Ck1	B2R	Ss1	C2	Th1/ 2	As1
C	C	C	C	C	C	C	C	C,Ku	C	C,Ku	C	C,Ku	C	C,Ku	"S"	C	C,Ku	C,Ku	C	C

128	130	134	138	(139)	140	145	146	148	(151)	152	156	160		166.5	169	174	177	180	177	148
Jc3	ANI	Ap1a	Ap1	Or3s	S7	S16	Ag2	Me2	C1	A3	B3	B1		PAS8	PAS2	I801	I702	I701	IF3	Es4
C,Ku	C	C	C	C,Ku	C	C	C,Ku	C,Ku	C	Ku	Ku	Ku		C,Ku	C,Ku	C	C,Ku	C	C,Ku	Ku

Ap1A/134E	3900/1250V	CETV2	
	3980/1170V	CETV1	
Ap1/138E	4160/990H	CCTV7	
S7/140E	3675/1475R	Test Card	mod. inclined
S16/145E	3675/1475R	ORT	high inclined
	3875/1275R	Feeds, tests	high inclined
Ag2/146E	3787/1363H	GMA	poor s. eqtor
Me2/148E	4080/1070H	test card	occ. use
C1/150E	4160/990H	TPI	occ. use
PAS8/166.5	3865/1285H	Napa test card	not full time
PAS2/169E	3940/1240V	CNNI	1/2 Tr format
1802/174E	4166/984R	Feeds	
	4177/973R	Feeds	
1702/177E	4166/984R	Feeds	KBS Korea
	4187/963R	Feeds	Feeds
1701/180E	3810/1340R	Feeds	
	3841/1309L	RFO	East beam
	3845/1305R	Feeds	inc. USA
	3930/1220R	USA Feeds	Typ. encrypt.
	3975/1175R	Feeds	
	4060/1090L	Feeds	
	4130/1020L	Feeds	

Major Changes - Next 30 Days

Perhaps the "most important" thing likely to happen before mid-August is the much anticipated appearance on KIBC (As2) and SPN (I701) of the SPACE Pacific Report weekly (one hour) TV programme. Major thanks to suppliers Av-Comm Pty Ltd, Satech and Sciteq for being sponsors to this innovative industry TV programme. Check out <http://www.satfacts.kwikkopy.co.nz> for the broadcast schedules as announced. In the equipment area, look for the spread of pay-TV (Irdeto and other) piracy into major Asian markets over next 60 days.

Optus B3 at 156E / Ku only

12.720/1420V	Aurora MPEG	Irdeto CA IRD	see p.15.18 May
12.688/1388H	Austar MPEG	Irdeto CA IRD	list p.31
12.626/1326H	Austar MPEG	Irdeto CA IRD	list p.31
12.594/1296V	Aurora MPEG	Irdeto RABS	see p.15.18 May
12.564/1263H	Austar MPEG	Irdeto CA IRD	list p.31
12.532/1232V	Aurora MPEG	Irdeto RABS	see p.15.18 May
12.438/1138H	Austar MPEG	Irdeto CA IRD	list p.31
12.407/1107V	Aurora MPEG	Irdeto RABS	see p.15.18 May

Optus B1 at 160E / Ku only

12.730/1430H	RHEF, NZ feeds	typ FTA anal.	occ. use
12.576/1276H	ABC Radio	digital	
12.570/1270V	OmniCast		FM/FM
12.541/1241H	Herbalife	Mon. Wed	1000-1100UTC
12546/1246V	Sky NZ	NDS-MPEG	&12.518(CA)
12.520/1220H	Net 9 feeds	typ. BMAC	
12.518/1218V	Sky NZ	NDS MPEG	& 12.546 (CA)
12.482/1182V	Net 10 feeds	typ. E-PAL	
12.480/1180H	Net 9 feeds	typ E-PAL	
12.455/1155V	Net 10 feeds	typ. analogue	
12.418/1118V	Sky NZ	NDS-MPEG	& 12.391 (CA)
12.391/1091V	Sky NZ	NDS MPEG	& 12.418 (CA)

Oddball Formats

PAS-4/68.8	3785/1365V	Discov. India	BMAC
PAS-4/68.8	3860/1290H	ESPN Indian	BMAC
Ap2/76E	3960/1190H	HBO Asia	GI Digiciph2
C2/113E	3930/1220H	Fil. Peo. Net	GI 1.5 MPEG
PAS2/169E	3836/1314H	ABS/CBN	GI 1.5 MPEG
PAS2/169E	3989/1161V	Fox/Prime	Sal.5MPEG

Daily Updates from SatFACTS!

Go to Internet, enter <http://www.satfacts.kwikkopy.co.nz>. Daily news reports, dialogue between observers, unusual references and a "feature" report updated each month.

July Alert

There are no new satellite launches until late August. With increased Ku-band activity in the offering, this might be a good time to locate a Ku-quality dish in the 2.4 - 3m size range which can be motor driven on a polar mount.

Upcoming Satellite Launches

NSS-K to 95E - 30 HP Ku, now "late August"
 Chinasat 8 to 115.5E- (date unknown) 32C. 16Ku
 Telekom 1 to 108E - "late August", replace B2R
 co-launched with
 AsiaStar to 105E (1452-1492 L-band radio)
 KoreaSat 3 to 116E -12-18 August, 16 Ku to replace Ks1
 Express A1 to 80E - August 30, 12 C, 5 Ku

WITH THE OBSERVERS

AT PRESS DEADLINE

A fax to David Leach from Intersputnik's Yuri Conrad (fax ++7-095-253-99-06) advises the 142.5E position is now officially designated LMN-AP-2. Old Gorizont bird now there may be in line for replacement which would be good news for programmers looking for transponder space.

AsiaSat 1/122E: Ex105.5E bird should be arriving at and testing from this location as or before you read this report. Satellite is only slightly inclined but may quickly become more inclined as station keeping fuel measure until As4 arrives sometime late in 2000.

AsiaSat 2/100.5E: TVSN is back at 4033/1117Vt (SR 4.298, 3/4; VPID 308, APID 256) but is part of Sky Racing SCPC & MCPC uplinked package at relatively low signal level. "Fashion channel is now one of if not the strongest signal from this satellite on 3796/1354Vt, SR 2.533, 3/4" (Mathews, NZ). New radio service channel inside of Guandong/GDTV 3840/1310Hz service: Hong Kong Radio is APID 81 (VPID 160, companion TV audio APID 80). Solution to reloading and making KIBC play - see p. 2 here.

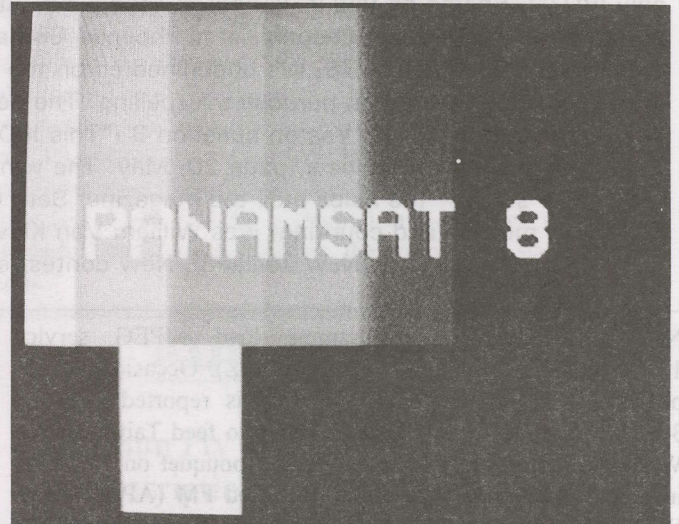
AsiaSat 3S/105.5E: "Arirang drives my Phoenix 333 bargraph to 71%" (Mathews, Auckland). CNNI went CA as scheduled June 15 (3960/1190Vt) although 2nd and 3rd programme channels have occasional feeds FTA. "Still had audio FTA on Phoenix 333!" (Jepson, NZ). "All new analogue services P5 except [V], Phoenix P4" (Brimo, PNG).

Gorizont 29/130E: THT is in PAL which has to be deliberate on their part; is this an attempt to serve viewers outside of Russia, which is SECAM? (Zapara, WA) "Can switch between NTV in analogue and THT in digital and see my SECAM-PAL switching working; signal is P5 here, best around 1AM NZT (Mathews, Auckland).

InSat 2E/83E: Testing is winding down; colour bars on 4036/1114Vt and 1096Vt are now gone. DD-1 National comes and goes on 3849/1301Vt (Zapara, WA).

Palapa C2/113E: C-Net Taiwan turned on 11 programme channel package on 4000/1150Hz (SR 21.095, 5/6) which seems to be parallel to encrypted 3760/1390Hz. "I load 11 channels of which 1, 2 and 11 are encrypted and 5 is adult porn" (Frost, Qld). Some may find the service is erratic, requiring frequent reloading. Video is NTSC. "France TV5 - I assume - now appears in Mega TV channel list (3780/1370Vt) but must be CA like the rest of the channels there" (Leach, NSW). TV3 Malaysia is not always here, another C2 'anomaly' (3900/1250Vt). "Something major is about to happen with ATVI" (reader, Hong Kong).

Optus B1/160E: "Imparja uplink 12.367Hz is not always there, you may have to programme in manually the parameters (SR 5.424, 3/4)" (Nolan, Qld)



ABC did it. Shut down their "Interchange" feeds on PAS-2 Ku and moved to PAS-8 Ku (12.332, 6.978, 3/4). Big loser is New Zealand which is outside of PAS-8 footprint. Australia, PNG find PAS-8 signal stronger than PAS-2 was.

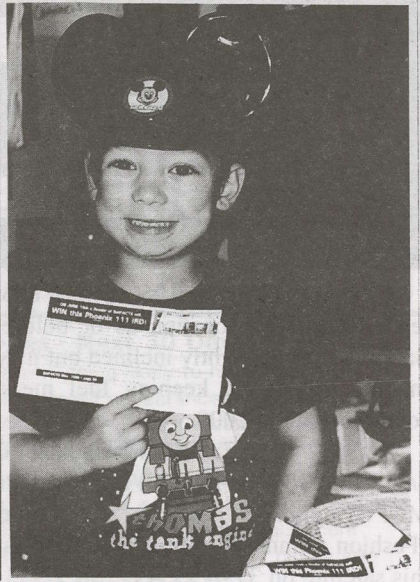
Optus B3/156E: Victoria school system will be occupying Aurora (BTV2) channel 5, CA, as switch from B-MAC progresses this month. Weather 21 on 12.438Hz in FTA has video PID 519, audio PID 657. "The clown who recommended Ku band reception for here in northern Queensland made a big mistake. For Aurora, the minimum size is a 1.8m and for Austar a 2.4m and even at that both sides are lost in even a moderate rain while by comparison TARBS on 1m is more than enough dish" (Nolan, Qld).

PAS2/169E: TCS (Singapore) has switched from 4183/967Hz to same frequency vertical; SR 6.620, 1/2 (Hendriks, Tasmania). EWTN, within California bouquet, has shutdown (June 30) and is now only available in PAS-8 (3940/1210Hz; VPID 2560, APID 2520). Muslim Television Ahmadiyya (MTA) after test using California bouquet early in June has signed contract for one year and now appears there full-time (3901/1249Hz, 30.800, 3/4, programme channel 8). Reliable analogue signals here now gone but Panamsat card appears from time to time on 3905/1245Vt and Herbalife appeared there for one week (Mon/Wed) during June (Jepson).

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 August 15th issue: August 6 by mail (use form appearing page 34), or 5PM NZT August 7th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.

Not a Mickey Mouse Contest - next time pay attention to the "detail"

SatFACTS for May reviewed the Phoenix 111 ("Triple-One") digital receiver and included a contest entry form allowing readers to have a shot at winning the Satech branded IRD. There were four questions to "qualify" the entrant. The entry form said - "Answer these questions: (Be very careful to **DETAIL** - there are some **TRICKS** in here!)." 72% of all entries failed to answer one or more questions correctly! The most common error was to check Yes for the first question ("The Phoenix 111 is a digital only IRD?"). Shame on you if you got it wrong! Yes, it IS digital only. No, the name is NOT spelled Pheonix - it is Phoenix. Go back and read page 8 November 1998 SatFACTS. We underlined eo on the entry form to draw your attention to the on-purpose misspelling. The next most common mistake was to check Yes on question 3 ("This IRD is manufactured in Europe?"). Reread the review, page 20, May. The winner, drawn out of a hat by SF "staffer" (he helps mail the magazine) Seth Cooper (age 3 years and 10 months and counting) was William Van Klavern, Upper Hutt, Wellington (New Zealand). New contest shortly!

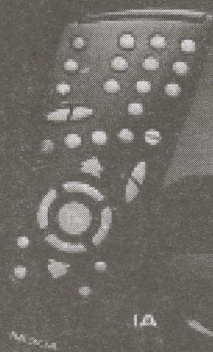


NZ). Unidentified 4 programme load MPEG service 12.436Hz, SR 20.553, 3/4 (McLeod, NZ). Occasional feeds on 3992/1158Hz, SR5.632, 3/4. JET is reported back on 3963/1187Vt (SR13.740, 1/2) - may be to feed Taiwan (CA). WIN-TV addition to PowerVu (GWN) bouquet on 12.265Vt includes TV service with audio plus Red FM (APID 1063), WAFM (APID 1122), ABC 6WF Perth (APID 1222), Sunshine FM (APID 1622) and ABC Parliamentary Radio (APID 1623) (Zapara, WA). Middle East bouquet on 3778/1372Vt continues FTA but at (again) reduced eirp. Antenne Pacific VPID 512, APID 650; LBC Australia

2433/2434; ART Australia 2435/2436 and RAI Italy 2437/2438.

PAS8/166E: ABC interchange with 3 carriers turned on here July 1, shutdown on PAS-2; coverage is better to Australia. PNG but 'gone' for NZ. Parameters: 12.332 primary channel. SR 6.978, FEC 3/4 + 12.324 and 12.315. ESPN was briefly testing on 4020/1130Hz (SR 26.466, 7/8) with identical programme line-up as PAS-2 3859/1291Vt. Testing feeds reported in Australia on 12.681Hz, SR 17.985. 3/4. CNN Hong Kong backhaul feeds to Atlanta found on 3811 1339Hz. SR 9.998, 3/4.

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S-band Cakrawarta programme line-up - day to day changes

All CA except as starred (* - as of our press deadline) NDS: SR 20.000, FEC 5/6.

#7-HBO Asia, #8-Cinemax, #10-Hallmark, #11-AXN, #12-Discovery, #15-Discovery, #17-Animal Planet, #19-Nickelodeon, #20-TNT/Cartoons, #21-Kermit, #23-MTV Asia, #24-I-Musik, #25-MCM, #26-CMT, #32 BBC World, #33-CNN, #37 - Bloomberg, #39-TVRI, #40-RCTI, #41-SCTV, #42-Anteve, #43-Indosiar, #49-TCS, #50-RAI, #51-TV5 Asia, #52-Sony Entertainment TV, #60-NHK Premium (sold as add-on to basic), #61-Fashion TV (sold as add-on to basic). Temporarily in clear: #950- test of stock exchange data(*), #960-CNBC(*), #961-Star Sports Asia(*), #991-Mosaic 1, #991-Mosaic 2. Radio/audio services: #200-Radio Trijaya, #201-Radio ARH, #202-CD Musik.

ST1/88E: Nila TV has begun programming on 3582/1568Vt, audio 6.60 and 7.20 (Zapara, WA) "But is mostly grainy, old tapes" (Nolan, Qld).

Thaicom 3/78E: ATN 3616/1534Vt has changed name to ETN.

Pay-TV In Middle East

(report from Gregorio V. Hermosa, Jr. in Oman). "Pay service Showtime is giving a free install to prospective subscribers. The bouquet includes MTV Europe, Discovery, The Movie Channel, TV Land, VH-1, Paramount/Nickelodeon, Style, Bloomberg, Hallmark Movies and Sony Entertainment TV. The full bouquet is US\$66 per month while the mini-bouquet (The Movie channel + any two others) is US\$48 per month. Add additional channels at US\$6 per month up to point of paying more than a full bouquet. For the full bouquet, the dish, LNB and installation is free or US\$64 installed for the mini-bouquet. On top of this, they lease the IRD with Irdeto CAM for a deposit of US\$124. If the subscription is paid monthly by credit card the subscriber does not have to lease the receiver. If you pay for a full year in advance, you receive 2 months extra free service; pay six months and get one month

free. There are also ten radio channels which work without a subscription most of the time. On a Nokia 9200S equipped with a plug-in Irdeto CAM 1.13f, often several of the channels are FTA even without a card. Of interest - after doing a search and Nokia load, if the viewer goes straight to view the receiver shuts off. If you load the 3 channel mini-bouquet, then erase channels 1 and 2 before viewing, the 3rd channel stays in FTA mode!"

AUSTRALIAN?

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The Internet "hype"

As we report here on page 15, the current magic word in satellite pay-TV financial circles is "Internet." If you could create a new word that merged "pay-TV" with "Internet" and use it to describe your company, or a service from an existing company, financial managers world-wide would salute you.

As an installer or retailer of satellite equipment, consumers expect you to be conversant on the latest and newest trends and gadgets. It is very likely you are being asked "What about Internet through my satellite system" or, "When can I get faster speeds for Internet than my telephone line can supply?"

When engineers create new widgets that do wondrous things, their "engineering descriptions" are typically concise and leave little room for puzzlement as to the capability of the new widget. But this is now - almost - the 21st century and engineers no longer run the world. Marketing people control the print and electronic media and marketing people are by nature seldom hamstrung by exact descriptions. The illusion - and it is mostly false - is that just a calendar page turn or two away, individual homes will avail themselves of direct connection to satellites for really fast Internet and a host of other new services that are simply not practical with existing twisted pair telephone line networks.

Let's see what the engineering limitations really are. First we have the challenge of equipping individual homes with transmitters. If a home is to only receive Internet via satellite (as in downloading Internet files), the home system requires no transmitter. Austar has experimented with this recently, still is doing so as this is written. By equipping a (home) PC with an IRD "card," Ku or C-band signals down converted to L-band flow into the PC. The bandwidth assigned to downloading (sending) material to a single customer can be virtually anything that is economical. A really good telephone line (twisted pair) modem will let data flow at a rate of around 50 kbps. Hook the same PC to a satellite download network and the flow-through speed can be 400 kbps or any other number that the satellite bandwidth available will support. But this is one-way only. The PC still has to request connection to a desired Web site or server or file and for this request direction, the PC still uses the twisted pair telephone line. Even with one-way only, satellite downloading is worthwhile and some people will spend money to have it. How much they will spend is untested. Whether there are sufficient people willing to spend premium money to make a business out of satellite downloading when consumers can have a slower but useful twisted pair connection for a modest amount per month - remains to be seen.

When Austar (or any other service provider) begins downloading Web data via satellite, they need bandwidth to do so. Studies I have read suggest a present Optus B3 transponder that is capable of cramming in perhaps a dozen MPEG-2 digital TV signals might handle a few thousand simultaneous users of Internet. With improved compression

techniques, that number will grow. But it is inescapable that for each new Internet user through Austar, bandwidth will be required.

Which brings us to the Telstra plan. They have signed an agreement with satellite builder/operator Loral Space and Communications and French firm Alcatel to begin using - three or more years down the road - something called Skybridge. What's that?

Skybridge is a Ka band (20/30 GHz frequency range) satellite system still on the drawing boards. It will have the technical ability for a consumer installed "transceiver" to communicate directly with the satellite. No telephone lines at all. When this happens, Internet via satellite will (for the first time) become two-way. We say "for the first time" overlooking that it is possible to have SCPC Internet service today using C-band or Ku-band transceiver packages. They cost a bundle (upwards of US\$10,000), require usually complicated site by site licensing and engineering, and are a long ways from consumer friendly.

Skybridge is intended to be as easy to install as today's DTH system. You will - if you last in this business long enough - one day in 2003 or so be asked to install a transceiver system that receives and transmits. Comet - if they last that long - will be sending out teams of technicians doing essentially the same work they do today for Austar or Foxtel - except of course the terminals will "talk" as well as listen.

But this is not available today, not at the "consumer" level. And it won't be available tomorrow either. Unfortunately, that is not stopping the marketing types that are busy hyping the transition at Austar (and one day soon - Sky NZ) from TV provider to TV + Internet provider.

You have been asked - will be asked - to explain what is really possible with a satellite TV terminal. The answer is - "satellite TV." For the typical user of Internet, the speed change from 10 or 20 or even 50 kbps to a theoretical 400 is only significant when the user is downloading massive multi-megabit files. The average Internet using consumer, hunting and pecking on their keyboard, will find it only mildly better and slightly more useful than what they now have from the telephone company. Speed is nice but let's be realistic here: Going faster is not always the best way to travel.

All of this discussion assumes something that could well be totally incorrect. That being, bandwidth is infinite. Optus B3 has only so much available and the more people Austar sells to TV + Internet, the more the available transponder space becomes a problem. A 400 kbps download speed assumes a near ideal technical world; if Austar + Internet is really only selling a faster delivery service, at what point does transponder capacity limits become a brake on actual speed? The answer is - we will know when we know. With people signing on and off constantly, the model is in a constant state of change and the data needs of each individual user affect the total bandwidth available.

None of this is a forecast that Internet delivery by Austar or others will fail. It will not. But there should be caution, even some optimism, held in reserve that combining satellite TV delivery with Internet downloading is a suitable "next generation" for our industry. Let us suggest it represents a stepping stone, a plateau, between the existing restricted speed twisted pair modem and the real next generation data delivery world. When it arrives, we'll all know it because at that point we won't be able to tell Internet from TV. It will all look the same.

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MORE - SPACE Pacific technology research specials for July 1999

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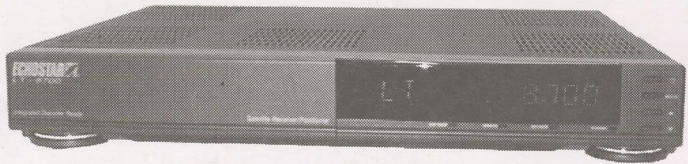
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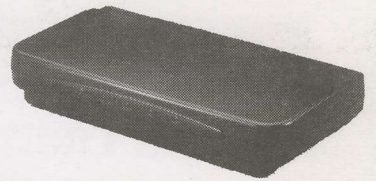
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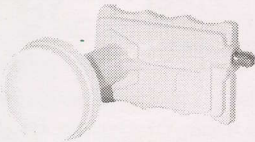


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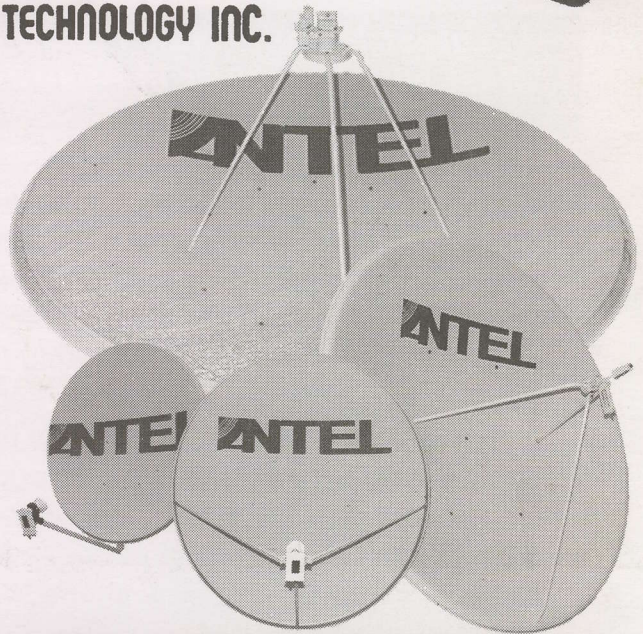


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