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Bob Cooper's

SEPTEMBER 15 1998

SatFACTS

MONTHLY

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

IN THIS ISSUE

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Editor/Publisher
Robert B. Cooper (ZL4AAA)
Office Manager
Gay V. Cooper (ZL1GG)

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ERRATA

COOP'S COMMENT

September 15, 1998

Here is a scenario to think about. Star TV Asia is in shambles. Essentially, they have no real business save some advertising revenue from old fashioned analogue services still languishing on AsiaSat 1. And month by month, these As1 services are being rationalised, merged and moved to digital. Worse yet, their contract to manage Indovision is a disaster because Indonesia is itself in disarray. A casual conversation with a Star TV person late in August included the observation, "*Indovision won't make it to the first of the year.*"

So what does News Corp do to breath some new life into Star TV? Indian expansion is held in check while awaiting new approvals from the Indian Parliament. It will be a long, expensive, wait. Chinese expansion is subject to political favour and while the Chinese seem approving of programming on the Star TV Phoenix Channel (now allowed into some Chinese venues by Government fiat), it could be ten years before China is really an open market. Japan's merger with another DTH operator may work; it may not. It is going to be long-time unprofitable in the best case. And a partnership in Korea, possibly utilising the new Orion 3 Ku band transponders, seems less and less likely to activate in this century.

Back to basics. There is promise in Hong Kong. And Taiwan, perhaps in the Philippines (if the thievery problem can be licked). These are potential "deep water" ports that could produce significant revenue for money losing (more than US$100 million in the last year) Star TV Asia. There are several dozen "thin water ports' as well; countries where at least the middle and upper crust business and professional people could afford new digital DTH terminals and monthly programming fees (charged to credit cards in currency foreign to their home port).

AsiaSat 3. An announcement. Here it is in black and white - Star TV Asia will take seven C-band transponders, using both vertical and horizontal polarisation, on As3, when it launches sometime after March 15th. Seven new transponders, using the latest NDS Reflex (tm) statistical multiplex technology, can cram 12 TV programme channels into a single C-band transponder. That's 84 TV channels for those without a hand calculator nearby. And yes, AsiaSat 3 was designed with that wondrous huge footprint that lays in 31 dBw (2.4m dish) from New Zealand to Moscow (SF#31, p. 18).

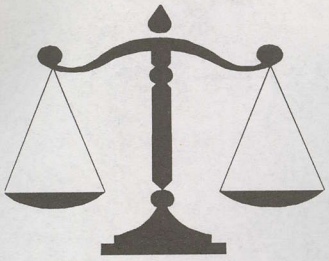
I need to emphasise there is no announcement from Star TV as to what they intend to do with these 7 transponders, except to suggest their present use of AsiaSat 2 and AsiaSat 1 will be consolidated on As3. So any suggestion that they will offer regional packages of copyright cleared material for each of several dozen different markets is premature to say the least. Speculating Star TV will bring MGM Movies, Fox News and a dozen more C-band service channels to Australia on AsiaSat 3 is a no-no. For now.

Star apparently realises that while the rest of the world has adopted Ku-band for pay-TV, Asia remains a C-band market. Good on them for rediscovering the obvious. And if they do decide to package programming by geographic region, and use NDS encryption technology to ensure only the right channels go into each location, good on them twice. It will take something of this creativity to jump-start an ailing Asian TVRO and DTH marketplace. And if some of it leaks into Australia and New Zealand, so be it.

In Volume 5 ◆ Number 49

-ON THE COVER-

Untangling the corporate decisions at Foxtel, Optus and Austar to put together a realistic and profitable satellite DTH offering for Australia. A very big challenge. As the pieces fall into place, we update you on page 15, here.



LETTERS

SNG from Palau

"As we discussed on the telephone, I work for Channel 7 Sydney and operated the SNG Fly Away via Intelsat 701 on behalf of SPN during the Palau Micronesian games late in July and through mid August. The uplink EIRP was limited by the 1.5m uplink antenna and 400 watt TWT amplifier we had available. This equates to a maximum EIRP of 63 dBw. Because SPN was (at the time) the only user of this particular transponder, Intelsat TOCC agreed to change the bird gain settings from 14dB to 8 dB. This helped a little and at that point I was running at 3dB IBO. Some downlink sites were reporting not sufficient signal, most had inadequate margin and we requested a further gain step setting. Intelsat obliged by allowing a change from 8 to 4dB. After this change I was able to achieve 0dB IBO with around 60dBw EIRP. To our knowledge all of the downlink sites were able to receive the service although this resulted in an increase in the noise floor of the transponder which we could 'see' on our 12m dish in Sydney. The noise floor increase would not have been noticed by the smaller TVROs around the Pacific as they had much lower G/T figures than our Sydney control. We received calls from such diverse locations as Mildura in Australia (3m dish) and Detroit, Michigan (!) to say they were receiving the service. In a nutshell, the satellite Gods must have been smiling on us and the exercise was a complete technical success."

Aaron Gosschalk, Microwave Dept, ATN Ch7
Epping, NSW, Australia

Kudos to SPN for a gutsy call to go "portable" into Palau to bring live coverage of the Micronesian Games to the Pacific. That a 1.5m dish with a modest 400 watt output could provide coverage comparable to the normal SPN uplink from Nauru is an eye opener, even if Intelsat did have to break a few operating rules to make it happen. A superb job by all concerned! (Detroit, Michigan? Egads!)

Appreciation From the 'Master'

I see/envy the 'cover story' ("Tracking the Clarke Orbit Belt With the Polar Mount") in the August SatFACTS. Please browse my Site <www .gourmet-ent. com> for a very similar methology, and, the ARC SET Tool which relieves the installer of a need for a compass (or the need to have a plumb foundation pipe!). I also remind readers of a much shorter 'Product Review' that outlined my own similar system in SatFACTS for November 1995 (p. 19). One observation on the recommended 'Smart Level.' It should/needs to be re-calibrated frequently (between each use if not between each reading). This does not take long to do and is worth the effort in saved tweaking time."

Jim Roberts, Gourmet Entertaining, Los Angeles, Ca.

PROGRAMMER PROGRAMMING PROMOTION UPDATE

SEPTEMBER 15, 1997

Personal note. This issue, the 49th for SatFACTS, launches us into year five of continuous publication. To our thousands of readers in 48 countries world-wide, our profound gratitude for making this a fun, exciting publication to create monthly!

SPACE/Mark Long Installer courses examinations now available off Internet Web site maintained by Mark Long (mlesat.com). Why? SPACE members taking either Satellite TV Installer or Satellite Technician certification courses can now download exam and prepare (as directed) answer key to email back to instructor Long (mlesat@mlesat.com) for instant test grading. We move ever closer to "instant gratification" from the TV toob!

Foxtel is asking cable subscribers to support their battle to deny Australian TV broadcasters a copyright fee (which Fox is labelling as a "viewing tax") and with September programme guide provides detailed instructions for individual lobbying of Canberra. See our report on Copyright, here, p. 11.

Perhaps it is a coincidence but satellite dealers in greater Brisbane area of Queensland are experiencing sudden upsurge in consumer interest in European Bouquet terminals. One dealer reports "14 new Deutsche Welle related installs in three weeks" while another reports "4 new French language families installing dishes in one week." The coincidence? Local 'community' terrestrial TV channel (31) has been tying into the European Bouquet for programming of late, exposing to viewers a small segment of the larger content of EBB. "*We feared the terrestrial segments from EBB would kill dish sales - it has had just the opposite result!*" notes one dealer.

Careless fellow or deliberate plant? Personnel associated with the "product security" department at Optus reportedly left a file folder containing detailed report of ongoing Optus investigation of a Victoria firm alleged to be engaging in pirated Irdeto software lying about recently in Sydney. Curious eyes scanning the folder discovered Optus has solid leads pointing to a business they believe has supplied counterfeit (Galaxy) Irdeto cards to Western Australia locations. File contents indicated investigation has 'priority' and the firm is being watched carefully for indication it has subsequently 'cracked' the revised Irdeto data stream now being used by Austar and Foxtel.

Sky Network NZ update. Australia's largest DTH system installation firm, Comet Installations, plans to establish similar North and South Islands offices to support Sky digital launch and will advertise for installers shortly. Want a head start? Contact Kingsley Mundey at tel 61-2-647-3101 or fax 61-2-9647-3111. Also see p. 30 here.

NDS has demonstrated (Beijing, late August) new statistical multiplexing which automatically analyses video content and adjusts bit rate (bandwidth) on a frame by frame basis. System, called Reflex (tm), enables number of programming channels per transponder to be increased by dynamically adjusting bit rate between 700 kilobits and 10 Mbit/s. Bottom line? More programme channels per transponder, *perhaps* reduced video quality (a point NDS would argue is not the case).

Revised PanAmSat plan. PAS-7 is scheduled for September 15 launch via Ariane heading for 68.5E where it will join PAS-4 to serve Indian Ocean and African region. PanAmSat's Galaxy 10 failed during lift off from Cape Canaveral late in August.

Panasonic TU-DS210 source: Evcom Aust. Pty Ltd at tel 61-2-9316-5055 at A$795 including smart card.

Warning. Be very careful ordering PowerVu IRDs through firm calling itself Horizon Satellite Systems in Perth. Several fraud cases are reported pending.

"I would like to thank you for doing a fine job with my Polar Mount article in the August SatFACTS. I especially appreciate the editing you did to make the article more powerful and including some input from Mark Long. I should have dedicated the article to Mark Long who is my greatest inspiration to learn as much as I can about this exciting field. What a pity the human brain is not more like the Nokia Mediamaster where you can just download data and off you go! Oh well, it simply means it will take a little longer to learn and the learning never ends!"

Pietro Casoar, DigitalSat Communications
Melbourne, Victoria

Our product review of Jim Roberts ARC SET tool properly credited Roberts with creating the quick-dish-alignment procedure which Pietro described in step by step detail in our August issue. However, it was obvious to us Pietro worked out his variation of the technique quite on his own, and rightfully deserved recognition for his innovation. Moreover, SF readership has more than quadrupled since the ARC SET review and there are thousands of new, 'unwashed' satellite installers now reading this publication who would never have heard about Roberts or the ARC SET (which remains, by the way, the handiest one-shot tool an installer can carry with him). Of further interest, Roberts has secured step one approval from the US Patent Office for his latest 'Sundial Method' of aligning satellite dishes; a system that uses no tools at all to align a dish!

Australian Rugby to Bali?

"With a 16 foot dish, Echostar analogue and HSS100C, I have been unable to locate Australian Rugby League matches from this location. Can anyone help me, perhaps a wild card feed?"

Peter Jones, Bali Rock Cafe, Kuta, Bali, Indonesia
fax ++62-361-761277

Loss of Arabic/LBC Feeds on PAS-2

"Arabic consumers here in Geelong equipped with HSS100C 2.25 IRDs have lost ART service on PAS-2 (4151) and LBC will not load either. Any clues? ART still loads OK on my 12' Paraclipse dish."

Jack Smith, Bay City Antenna Service, Highton, Vic.

PAS-2 levels for this FTA feed have been significantly reduced, probably a deliberate attempt to deny FTA service to small dish users. It appears a 3m dish is the minimum that will produce reliable reception with the PAS-2 levels turned down.

Smart card for DigiSkan SK888?

"I have purchased an SK888 and want to use it for CA reception. Where can I get a smart card? I have a friend with an HSS100C that also needs a smart card. Can you help?"

Peter Wall, Bathurst, NSW

The SK888 first requires a CAM (conditional access module) and then a smart card. If anyone has successfully located a CAM for the SK888 that allows it to work on Austar, Foxtel or another Irdeto service, we have not heard about it. Perhaps a reader with experience can advise? As for the HSS100C, it was never designed to accept a CAM so cannot be used for pay-TV services.

Note: Letters appearing here may be edited for style and space limitations only.

HARDWARE EQUIPMENT PARTS UPDATE

SEPTEMBER 15, 1997

Beware of bar codes. Paris Cockinos of Sphere Communications advises, "*Lately it has become fashionable for some brands of LNBs to cast, affix or mould a product bar code number inside of the wave guide chamber.*" Simply look into the throat of the feed-facing end of the LNB to see if your LNB(s) have this product identification. This may be good for product inventory control, but it is lousy (and lossy) microwave engineering. Bumps, humps, protrusions, spiders, wasp nests - anything that interrupts the smooth inner waveguide surface acts as an unwanted barrier to microwave energy flow through the waveguide chamber. Paris suggests (and we second) removing the bar code implant from the waveguide chamber and then thoroughly cleaning and polishing the chamber. Paris also urges installers to polish the flanges of the LNB with "wet and dry" to a smooth surface which will improve conductivity (microwave energy flow) between the LNB and the feed. Finally, the rubber ring (gasket) seal must be properly seated in the grooves provided, tighten by going around in a circle torquing each bolt a little at a time (never tighten one up all the way and then another and another), applying a silicone grease to the gasket and mated surfaces of the LNB and feed. The difference between doing it wrong and doing it right? "*As much as 3dB carrier to noise,*" reports Cockinos.

SA D9223 authorisation change? Let us say you acquire a PowerVu receiver ostensibly for EWTN. Or CMT. And you decide, for whatever reason, to utilise the receiver for a conditional access service. Do you simply supply the TID and UA numbers of the IRD to the CA service operator? No. Life is not that simple. Each and every SA IRD has a registered use channel, whether it is presently being used for FTA or CA reception. *You* may have bought and paid for the receiver, it may appear on *your* inventory list. But the original service provider is in charge of its operation. To get it authorised for a new (CA) service, step one is to provide the PowerVu control centre in Miami (Romi Salerno, tel ++1-305-245-1919, fax ++1-305-242-6115) with the numbers off of your IRD (UA, TID), the name and contact numbers of the new CA supplier, and the name of the original service the IRD was sold to receive. Miami will then contact the original programmer and ask their permission to delete the receiver from their address stream, and the new CA provider to work out adding the receiver to that stream. When this is done, SA is contacted and a 'SSN' (secret serial number) is sent in a software programme on a computer disc to the new CA uplink control centre. There it is loaded into the uplinker's control computer and bingo - you are now transferred. Time? Up to two weeks. Cost? Free up to US$60 for the disc portion. Just another reason to be a happy SA customer.

AFRTS on Intelsat 702 at 177E? In answer to queries, no - it is not available to anyone outside of the closely controlled US military and diplomatic service category. Most US Embassy offices, some consulates have AFRTS. Most US military bases take AFRTS feeds to plug into base low power TV transmitters or closed circuit cable systems. The entire AFRTS feed on 177E is a bad place to have a D9223 receiver "playing around" as they often send something called a "bootloader sequence" through the data stream which is virtually guaranteed to do bad things to any PowerVu receiver not a part of the authorised service stream. What about non-PowerVu receivers that are PowerVu compatible? No reports of bad problems here but we have to ask - *why*, if the entire bouquet is CA, would you be snooping around there anyhow? Has anyone 'broken' the PowerVu encryption? Not to the best of our knowledge.

Warning: New from Korea Irdeto IRDs may not be priced with CAMs. Be careful - they may be US$40 or more 'extra.'

Digital Diagnostics, Part I

Symbol Rates and FEC: A Programmer's Choice

by Mark Long (copyright 1998 MLE INC.)

Those of us who work in the digital DTH business frequently encounter esoteric numbers that we must plug into the digital set-top box before we can begin to receive any digitally compressed satellite TV service, or unified "bouquet" of services. Its easy enough to do without giving the matter much thought or having to understand just what the terms "symbol rate" and "FEC rate" actually mean. This article provides the answers for those who would like to fully comprehend the significance of these esoteric terms as well as understand why some programmers may select one set of numbers while others choose different operating parameters.

MPEG-2 Satellite Modulation Techniques

MPEG-2 satellite transmissions use a digital modulation technique known as QPSK (for Quadrature Phase Shift Keying). The production of QPSK modulation requires the simultaneous processing of two bits of information, whereby the data rate is effectively doubled without an increase in the signalling rate. This is an excellent modulation scheme for those transmission platforms that are bandwidth constrained.

A simple modulation system such as binary phase shift keying (BPSK) varies the carrier frequency between two distinct phase states to correspond to the binary digits 1 (on) and 0 (off). QPSK, however, uses four distinct phase states instead of two, which allows two bits to be transmitted simultaneously by switching between different combinations—called symbols—of the four available states. The digital encoder at the uplink converts bits in pairs (called "di-bits") into equivalent two-bit symbols. The symbol rate for compressed digital video transmissions is expressed in Megasymbols per second (Msym/s).

Forward Error Correction (FEC)

The QPSK-modulated satellite signal contains special codes that the IRD uses to check that all bits of information sent have actually been received. This forward (sent ahead to the receiver along with the original message) error correction (FEC) technique creates a very robust signal with substantial advantages over an uncoded digital signal containing the same information content.

The Forward Error Correction (FEC) "overhead" consists of redundant symbols that are added to the original message. Although this increases the overall transmission rate and bandwidth requirements, the redundant symbols accentuate the uniqueness of the message in a way that prevents channel noise from corrupting enough symbols to destroy its uniqueness. The decoder uses the FEC symbols to restore data reliability after the message has been received.

One type of FEC encoding, called the convolutional code, is expressed as a ratio such as 1/2, 2/3, 3/4, 5/6 and 7/8. The number in the numerator indicates the number of original symbols entering the encoder and the denominator indicates the number of error-corrected symbols leaving the encoder. Therefore, an FEC of 7/8 means that for every seven symbols entering the encoder, eight symbols leave; in other words, there will be one error-correcting symbol out of every 8 symbols.

The other type of FEC encoding, called the Reed-Solomon code, adds the redundant symbols to individual strings or blocks of binary digits. The encoder accomplishes this task by only looking at the symbols that comprise each discrete string or block of digital bits. Reed-Solomon uses 188 bytes out of every block of 204 bytes for transmitting the original signal information. The remainder is used to send parity bits that the IRD can use to correct transmission errors.

The Reed-Solomon decoder uses an algorithm to simultaneously solve a set of algebraic equations based on the syndrome of parity checks from the retrieved block. It is particularly good at detecting and correcting bit errors generated by burst noise that can be caused by automobile ignition noise or microwave ovens operating in the general vicinity of the receiver.

FEC systems that look at previously transmitted blocks as well as the current block, are called convolutional coding systems. The convolutional encoder has a buffer circuit that holds the previously coded messages in memory for reference. Convolutional coding is particularly effective in correcting or concealing thermal noise bit errors.

Early coding experiments found that an encoder that used two coding techniques in cascade (i.e., one feeding into the other) could generate additional performance gains. The first code is referred to as the inner code, while the second is called the outer code. MPEG-2 DVB-compliant systems use convolutional coding as the inner code, with coding rates of 1/2, 2/3, 3/4, 5/6 or 7/8 available for use, and Reed-Solomon block coding as the outer code.

Digital Bouquet Trade-offs

As anyone who has faced the daunting task of programming a digital IRD to receive multiple program services or bouquets already knows, the symbol rate and FEC rate in use usually vary from one digital bouquet to the next. Just why is that the case?

As I previously mentioned, the satellite transmission medium is bandwidth constrained. Transponder bandwidths of 27, 33, 36, 54 or 72 MHz are the typical choices available to programmers in various parts of the world. All digital transmissions must therefore conform to the bandwidth constraints of the transponder that each programmer elects to use to deliver digital DTH services.

The maximum possible symbol rate is a direct function of satellite transponder bandwidth. This can be calculated by the following formula:

Maximum Symbol rate = BW/1.2

Where BW = the bandwidth in Megahertz

Recommended MPEG-2 Service Data Rates

Video Services	Data Rate
High Definition Television (HDTV)	14.0 Mbit/s
Studio Quality CCIR 601	8.064 Mbit/s
16:9 Wide Screen Aspect Ratio	5.760 Mbit/s
Live Sports	4.608 Mbit/s
Film/Broadcast	3.456 Mbit/s
Pay Per View Movies	1.152 Mbit/s
Musicam Audio	
Monaural	128 kbit/s
Stereo	256 kbit/s
Stereo Pair	512 kbit/s
Digital Data	9.6 kbit/s
Service Control Data	30.72 kbit/s
Component ID Overhead (percentage of total bouquet data rate)	2 percent

For example, the maximum symbol rate for a 36-MHz wide transponder is:

36/1.2 = 30 Msym/s.

Suppose a programmer elects to use a 7/8 FEC rate. The bit rate for the digital multiplex, or bouquet, would then be:

30 Msym/s x 2 (2 bits per symbol) = 60 Mbit/s

The transport stream's maximum data rate may be 60 Mbit/s in this example, but some of these bits are allocated to the forward error correction system and therefore are not available for the transmission of the original program material. To determine how many bits are available for relaying the original signal, we must subtract the "FEC overhead:" that is, the number of bits that the inner and outer FEC codes actually use.

60 Mbit/s x 7/8 (the inner-code FEC) = 52.5 Mbit/s

52.5 Mbit/s x 188/204 (the outer-code FEC)
= 48.382 Mbit/s

From this example we can see that only 48.382 Mbit/s out of a digital bitstream running at 60 Mbit/s are actually carrying the original programming, conditional access data and bouquet component ID information. The next example alters the FEC rate from 7/8 to 1/2 while leaving all other parameters the same. Let's see how this change in the FEC rate for the inner code impacts the available bit rate for transmitting program information.

30 Msym/s x 2 (2 bits per symbol)
= 60 Mbit/s

60 Mbit/s x 1/2 (the inner code FEC) = 30 Mbit/s

30 Mbit/s x 188/204 (the outer code FEC)
= 27.647 Mbit/s

A unified MPEG-2 digital bit stream, or multiplex, may contain eight or more TV services with associated audio, auxiliary audio services, conditional access data and the bouquet's component ID information. Any single video signal within this bit stream will have a much lower bit rate and also will vary according to the nature of the video source material (see chart above).

The FEC rate of 7/8 supports a digital bitstream of 48.382 Mbit/s. The FEC rate of 1/2, however, will only support a bit rate of 27.647 Mbit/s. This represents a dramatic reduction of 20.735 Mbit/s. If all other transmission parameters remain equal, a programmer using an FEC rate of 7/8 can transmit at least four more entertainment TV services than another programmer using an FEC rate of 1/2.

So why don't all programmers use an FEC rate of 7/8? The FEC rate 1/2 generates a very robust signal that will better withstand rain fades and deliver a stable signal to small-aperture receiving systems with minimum signal margin above receiver threshold. Each programmer must therefore make a decision on transmission parameters that balances the desirability of having a robust signal against their need to transmit as many TV services as possible through a transponder.

Mark Long is the author of **The World of Satellite TV,** founding publisher of **The World Satellite Almanac** and the compiler of the **EURO-Asia/Pacific Satellite Library on CD-ROM**. Mark also is the instructor for the SPACE Pacific technician and installer certification courses. He can be reached via his web site at http://www.mlesat.com on the world-wide web.

Digital Diagnostics, Part II

The Digital Video Broadcasting Standard

by Mark Long (copyright 1998 MLE INC.)

Most digital satellite TV broadcasters today are using a transmission system that conforms to parameters adopted by Europe's Digital Video Broadcasting (DVB) Group. The DVB standard, which was first published in January of 1995 by the European Telecommunication Standards Institute (ETSI), has since been adopted by numerous other broadcast entities around the world.

In 1994, MPEG-2 was adopted by the International Standards Organization as the worldwide standard for the compressed digital representation of video source materials. A commonly asked question is why do we need yet another standard when MPEG-2 was supposed to settle the issue once and for all? As the DVB Group likes to point out, MPEG-2 is not a single standard set in stone, but rather a flexible architecture consists of several "compression tool sets" that programmers can elect to use. What the DVB Group has done is select those MPEG-2 tools that best facilitate the the distribution of signals amongst different distribution platforms without requiring complex and costly decoding and recoding equipment.

DVB allows MPEG-2 digital signals to be seamlessly transported between various satellite (DVB-S), cable (DVB-C) terrestrial TV (DVB-T), SMATV (DVB-CS) and MMDS (DBV-MC or DVB-MS) distribution platforms without requiring any modification to the original transport stream. Satellite-delivered signals, for example, can be demodulated at cable head ends or terrestrial broadcast facilities and then seamlessly re-modulated for distribution. This dramatically streamlines the transferral process and results in economies of scale that would not have been realised if mutually incompatible MPEG-2 systems had won the day.

Delivering DVB Packets

The DVB encoder multiplexes all data into packets, with each packet containing a 1-byte header and a 187-byte message. The header contains a special code called the "packet identifier" or PID, which provides the instructions that the IRD needs to effectively process the message contained in each packet. For example, the IRD only needs to process those packets that contain the information pertaining to the service that the IRD is set to receive. All other packets in the digital transport stream can be ignored and discarded.

Four different package identifiers are commonly available. The VPID is the packet identifier for video data, while the APID is the packet identifier for audio data. The digital transport steam also must send a program clock reference (PCR PID) at intervals that the IRD uses to synchronise the VPID and APID packets. A data packet identifier (DPID) also is required to identify those packets that contain auxiliary data services, conditional access (CA) data, and the Service Information and Teletext data.

DVB Service Information and Teletext

One way that DVB has improved upon the architecture of MPEG-2 is through the introduction of a "Service Information and Teletext" (DVB-SI) component of the transport stream. This component includes each digital bouquet's satellite transmission frequencies, channel allocations and the modulation parameters.

The value of the DVB-SI is that it give each programmer the ability to reconfigure the digital IRD's software automatically from the uplink. The end result is that any changes made to the bouquet configuration are total transparent to the TV viewer. The digital IRD need only be set up once--usually pre-programmed at the factory--to find the first satellite transponder. After that, the IRD will be able to download all of the required transmission parameters, even if the programmer changes them from the original factory settings later on.

The DVB-SI component also sets the parameters for the transmission of an electronic program guide (EPG). The EPG can provide a wide variety of information, including service provider and channel name; programme name, type, and description; alternate channel programme lists; and forthcoming programme information.

The Program Association Table

The Service Information component contains a Program Association Table or PAT that provides each IRD with a list called a Program Map Table (PMT) that identifies every signal component within the MPEG-2 transport stream. An example of a PAT might look like the table presented below. From this PAT, the IRD can determine that the transport stream contains four video services and corresponding stereo audio pairs, as well as separate timing information for each service. The PMT also will provide the IRD with other information, such as the name and duration of each program service as well as any auxiliary data services that may be part of the digital bit stream. A Network Information Table (NIT) also is available that provides the IRD with a list the bouquet's associated transponders along with the transmission parameters for each transponder. In most instances, the associated transponders will be on the same satellite as the transponder to which the IRD is tuned. Some digital

Table 1. An example of a Program Association Table

PAT (PID 0000) = 0100, 0200, 0300, 0400
PMT 1 (PID 0100) = Video PID 0101, Audio PID 0102, Audio PID 0103) PCR 01FF
PMT 2 (PID 0200) = Video PID 0201, Audio PID 0202, Audio PID 0203) PCR 02FF
PMT 3 (PID 0300) = Video PID 0301, Audio PID 0302, Audio PID 0303) PCR 03FF
PMT 4 (PID 0400) = Video PID 0401, Audio PID 0402, Audio PID 0403) PCR 04FF

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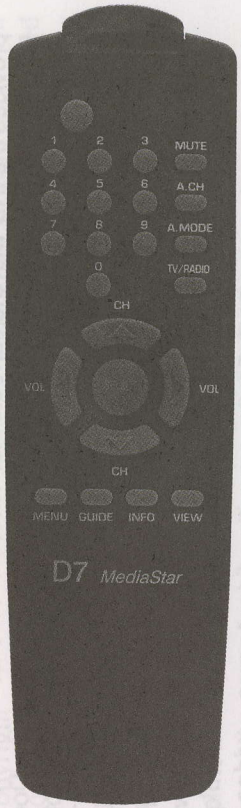

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Table 2: DVB Cross-Platform Compatibility Table

DVB-S - A digital satellite broadcasting system for television, sound and data services that predominantly downlinks in the 11/12 GHz frequency spectrum. DVB-S includes specifications governing structure, channel coding and QPSK modulation at 2-bits per symbol. DVB-S also sets modem standards for variable transponder bandwidths and data rates so that each broadcaster can match their transmissions to the available transponder bandwidth. DVB-S also supports two forward error correction methods: an outer FEC using Reed-Solomon block coding [204, 188, T=8] and an inner FEC that uses convolutional coding, with 35% half-Nyquist filtering and rates of 1/2, 2/3, 3/4, 4/5, 5/6 or 7/8.

DVB-C - This is a cable broadcasting system for television, sound and data services using standard cable TV distribution frequencies. The DVB-C cable specification is based on DVB-S, but the modulation scheme is *Quadrature Amplitude Modulation* (QAM) rather than QPSK. DVB-C is centred on QAM modulation with 64 symbols (64-QAM). However, lower-level systems, such as 16-QAM and 32-QAM, as well as higher level systems such as 128-QAM and 256-QAM, also are available for use. DVB-C over an 8-MHz cable TV channel can accommodate a payload capacity of 38.5 Mbit/s if 64-QAM is used as the modulation scheme. The level of noise immunity varies as a trade off of system capacity against the robustness of the data.

DVB-T - Approved in February of 1997, DVB-T is a digital terrestrial broadcasting systems for television over standard broadcast TV frequencies. DVB-T uses a transmission scheme based on *Coded Orthogonal Frequency Division Multiplexing* that uses a large number of carriers to spread the information content of the signal. The main advantage of DVB-T is that it offers a very robust signal in a strong multipath environment. Due to the advantage of multipath immunity, an overlapping network of transmitting stations with overlapping coverage areas can operate on a single frequency.

DVB-T is designed to use either 1,705 (2k) or 6,817 carriers (8k). Each carrier system uses QAM modulation with 4 to 64 Symbols and 8 MHz of bandwidth. The 2k mode is applicable for single transmitter systems or relatively small single-frequency networks with limited transponder power. The 8k mode can also be used for single transmitter systems, but is more appropriate for large-area single frequency networks. Like DVB-S, DVB-T uses Reed-Solomon outer coding and convolutional inner coding for its FEC system.

DVB-CS - This is a specification for satellite master antenna television (SMATV) systems that distribute programming to households located in one or more adjacent buildings. A common satellite dish is used to receive the signals, which are combined with terrestrial TV channels and then sent to each household by means of a cable distribution system. In this case, the SMATV head end is totally transparent to the incoming digital multiplex, which is delivered to each IRD in the system without any baseband interfacing required.

DVB-MC - This specification is for use with a multipoint distribution system (MDS) using digital technology and microwave frequencies. DVB-MC is based on the DVB-C specification for cable TV systems and therefore can use the same set-top box that digital cable systems use.

DVB-MS - This is another specification for use with multipoint distribution systems. The DVB-MS specification, however, is based on the DVB-S specification for satellite TV systems and therefore can use the same digital IRD that digital DTH systems use. Instead of using a satellite dish, the IRD is equipped with a small MDS antenna and frequency converter.

DVB-SI - The specification for Service Information (SI) in digital video broadcasting systems.

DVB-CI - The Common Interface Specification for conditional access and other digital video broadcasting encryption applications.

DVB-TXT - A specification for conveying teletext in digital video broadcasting applications.

DTH systems, however, are equipped with a motorised antenna actuator that allows the IRD to receive signals from multiple satellites. In this case, the Network Information Table can supply the information that the IRD needs to locate associated transponders on other satellites.

The DVB-SI component also contains a Bouquet Association Table or BAT that provides each IRD with comprehensive information about the program resources that are contained within the MPEG-2 transport stream. For example, the BAT can identify programme content by category or theme. A separate Event Information Table (EIT) contains scheduling information as to when each program will air and for how long, while the Time and Date Table (TDT) provides the IRD with the correct time.

DVB Compatibility Issues

Various digital satellite TV broadcasters and manufacturers emblazon logos onto their IRDs which proudly proclaim that the units "DVB-compliant." Does this mean that we have finally entered a new era of global video compatibility? We wish.

Although the DVB Group adopted a common interface for conditional access (DVB-CI), the committee did not agree on any single encryption or conditional-access standard. Each digital IRD must have a compatible conditional access module and smart card before it can successfully receive any encrypted digital bouquet.

In some instances, national authorities have taken steps to ensure that all digital DTH programmers operating within their borders use the same conditional access system. In Spain, for example, the three leading bouquet operators all use the same conditional access system, which allows viewers to subscriber to any of the available services and use the same IRD to gain access, albeit with the assistance of as many as three smart cards. More often, however, there will be two or more mutually incompatible bouquets available within the same country or region, with each bouquet requiring its own proprietary IRD and smart card.

Does a DVB-compliant IRD offer superior performance over other types of digital set-top boxes? Don't bet the farm on it. The signal quality produced by any digital delivery system, whether DVB or something else, is largely a function of how many bits are assigned to any given transmission within the digital bit stream; what you receive can range from quasi VHS all the way up to HDTV. The quality of the video that each viewer receives is determined by the bitstream parameters that the broadcaster elects to use.

COPYRIGHT:
What It Means to Your Viewing Options

copyright /'kopi,rait/*.n, adj., & v.* - *n.* the exclusive legal right granted for a specified period to an author, designer, etc., or another appointed person, to print, publish, perform, film or record original literary, artistic or musical material. *-adj.* (of such material) protected by copyright. *-v. tr.* secure copyright for (material).

Most of us remember EMTV (Papua New Guinea) and their original FTA service carried on a Russian satellite at 142.5E. It was analogue, covered an expansive portion of the Pacific and Asia, and while designed only for PNG consumption, developed a wider following. And then it installed Videocrypt equipment (utilising decoders acquired through SKY Network in New Zealand) to limit access to those locations with decoders. Videocrypt functions at two levels; an "open key" format where simply having the decoder in the video line unlocks the encrypted video, and a more complex "closed key" format which transmits individual decoder + smart card instructions to each authorised IRD. EMTV never moved to the closed key level because they knew use of Videocrypt was short term (they subsequently moved off of 142.5E to AsiaSat 2 where today they continue to operate in a closed key PowerVu digital format).

EMTV's management realised (from the pages of SatFACTS, unfortunately) they were being "watched" well outside of PNG. EMTV's management was also being told by programme providers the station could not purchase programming as a PNG (only) service as long as their *coverage region* extended from India to New Zealand and all points in between. Popular series such as 'Baywatch' and 'Superman', sought by EMTV, were withheld from the station until it could prove to the satisfaction of the programme suppliers there would be no 'wholesale' use of the EMTV signal outside of PNG.

'Baywatch' is copyrighted by the program's owners. Copyright is their legal right to decide as a matter of corporate policy *who* will use their programming, *where* it will be used, *when* it will be used and ... how much money the TV station will pay for each use. Copyright varies from country to country, the detail of what copyright means is determined by the laws of each country. However, during the last five years there has been an intense effort by American programme owners in particular to force United States copyright law on countries such as PNG. Copyright effects television programmes, music distributed on CD or cassette, printed materials including books and magazines. More recently, copyright has also been expanded to include computer software programmes, computer operating systems (OS), even microprocessor software programmes created for VCRs and self-timing home garden sprinkler systems. In short, copyright has invaded virtually every segment of modern life that employs any form of information storage.

The latest technology in recorded video is called DVD (Digital Video Disc). A DVD (disc) looks very much like a standard music or instruction (audio) CD except it is electronically configured to carry a digital data stream which when interrogated by an appropriate 'player' produces *video* and one or more sound channels. It is VHS movies without tape, presently available only as a playback technology (i.e., unlike VHS tape, it is not yet capable of home recording). The DVD world is now 18 months old, an estimated 600,000 DVD players have been sold to date with more than 18 million discs produced and distributed. DVD is instructive because it serves as a directly related example of how and why stations like EMTV are bound by copyright to programming material which the station can access only by following "rules" established by the programmer sources.

More than a dozen Hollywood studios have participated in the technical creation of DVD. They have the best of reasons to create 'competition' to the established VHS format of distributing movies and other home play video programming. Some - just a few - of the reasons include:

1) VHS can be 'violated' by anyone with the desire to make unauthorised copies of a movie. Simply rent a movie overnight, take it home, insert it into a home VHS player and copy it with a second player operating in the record mode. Any firm holding copyright on a movie distributed by VHS knows the 'security' of the distribution system is flawed. (**1**)

2) VHS is now more than two decades old. In 1997, a reported 900 million blank VHS tapes were sold world-wide. The total number in circulation is in the tens of billions. By throwing their collective weight behind a new format, one that solves the unauthorised copying problem, the movie makers are betting that over

1/ Various 'copy guard' systems (such as Macrovision) exist to make unauthorised dubbing of VHS products more difficult but consumer distributed hardware exists to defeat the copy guard techniques.

Region 1	Canada, United States, US territories
Region 2	Europe, Japan, Middle East (including Egypt), South Africa
Region 3	East Asia (including Hong Kong), Southeast Asia
Region 4	Australia, Central America, New Zealand, Pacific Islands, South America
Region 5	Africa, CIS (former Soviet Union), India, Mongolia, North Korea
Region 6	China

ABOVE - movie rights owners (studios) have created world regions for movie release scheduling. BELOW - DVD players currently sell in the US$400-up region and are "regional coded' ostensibly to prevent users from acquiring early-release (Region 1) discs for play outside of North America. "Neutered" players work without recognising a disc's region and are hot products outside of USA but little recognised inside.

a period of time - perhaps ten years - VHS will die and consumers will be forced ultimately to discard their collection of VHS movie tapes and purchase DVD technology movies as a replacement. In effect - the movie firms have the opportunity to *resell* the same product (i.e., same movies as on VHS tape) to the same customers all over again. Which will guarantee a decade of maximum prosperity for the movie firms.

3) DVD is digital. VHS tape is analogue. We all know from our satellite experience that very rapidly all television is transitioning to digital. Technically, analogue VHS tape makes no sense in a world which ten years down the road will no longer be generating or watching analogue TV in any form.

Fast forward now to the technical way the movie firms have designed DVD to function. Movies are first released in their country of origin; another way of saying virtually all of the 'world class' movies end up appearing in theatres in America first. Fifty years ago, this made excellent sense to the movie producers. They divided the world into segments, roughly following geographic boundaries (North America, South America, Europe et al), and then approached each 'segment' as a market. *Casablanca* was first released in the US and Canada, and over six to 12 months would be subsequently released in other world segments. This was in an era when movies had to be mastered on bulky 35mm film, and it took days or weeks to arrange for the shipment of two or three canisters of weighty 35mm film stock between Hollywood and Bombay.

For DVD, the world has been sliced and diced into 6 "regions" as explained in the table above. When *"Blues Brothers 2000"* was released on DVD late in August, it was only in Region 1 (North America). Region 4 DVD enthusiasts will wait 3 to 6 months longer for this movie to appear in a local shop.

But, quite contrary to the original plan, it is possible to acquire a "neutered" DVD player that is not restricted to playing Region 4 discs and once in possession of such a player, to shop (using Internet or catalogues) for *"Blues Brothers 2000"* the day it comes out in North America. (2)

What does any of this have to do with satellite TV? A great deal. The same mindset that created the DVD player technology and the regional approach to releasing software (movies on disc) is responsible for the business plan that offers programming to EMTV (and all other broadcasters and satellite programmers). If you understand their reasoning, you are halfway home to grasping why programming choices can become complex.

First - commercial programmers seek to maximise income for each programme transmitted. While some programmes can be sold repeatedly (such as the movie *Casablanca*) others (such as news and sport) cannot.

2/ DVD, the technology and the status of "region free players," has been extensively reported in Coop's Technology Digest. Issue 98-05-48 detailed sources for neutered players, Internet sources for players and discs while the subject is routinely updated in each edition of CTD (see p. 33 [here] for CTD subscription form).

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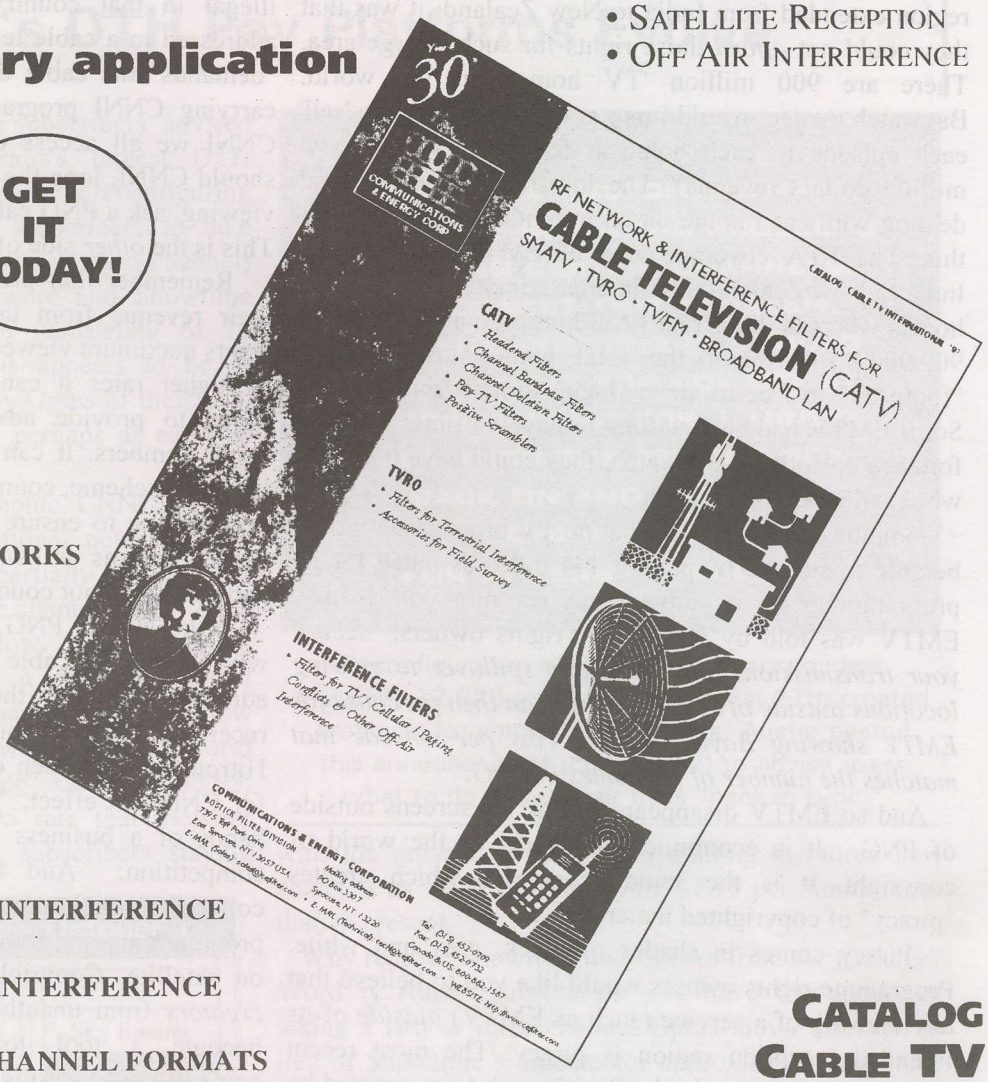

TVRO: FILTERS TO SUPPRESS INTERFERENCE

BOOKS: CATV, TVRO, MMDS, INTERFERENCE

APPENDIX A: INTERNATIONAL CHANNEL FORMATS
APPENDIX B: INTERNATIONAL CHANNEL FREQUENCIES
APPENDIX C: ORIGIN OF CATV, TVRO, PAY-TV

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Second - while DVD backers have divided the world into six regions, most television programming is sold on a per coverage region basis. It was not that EMTV could not purchase the rights to Baywatch when their coverage region extended from India to New Zealand; it was that they could not *afford* those rights for such a large area. There are 900 million 'TV homes' in the world. Baywatch owners would jump at the opportunity to 'sell' each episode to each home at ten cents a home (90 million dollars revenue). The logistics of locating and dealing with each home on an individual basis prevents this. The FTA coverage area of EMTV spread from India to New Zealand took in approximately 400 million homes whereas the actual PNG house count is closer to 900,000; 1/444th of the total homes inside of its "footprint" in free to air analogue format from 142.5E. So, if EMTV had been *willing* to pay 444 times as much for each episode of Baywatch, they could have bought it while still operating FTA.

Common sense tells you that no TV broadcaster would be able to survive by paying 444 times as much for its programming as its advertising revenue will justify. EMTV was told by programme rights owners, "*secure your transmissions, eliminate any spillover to viewing locations outside of PNG, and you can then purchase for EMTV showing Baywatch at a cost per episode that matches the number of TV homes in PNG.*"

And so EMTV disappeared from TV screens outside of PNG. It is economics which drives the world of copyright. It is the same economics which creates "piracy" of copyrighted materials.

Piracy comes in shades of black, grey and white. Programme rights owners would like you to believe that *any* viewing of a service (such as EMTV) *outside* of its intended reception region is piracy. The most recent copyright legislation in the Pacific and Asia, enacted by New Zealand late in 1996, deals with this type of viewing by suggesting it is illegal to break into an encrypted transmission which you have no authority to view, but does not go as far as suggesting it is illegal to acquire in the marketplace a decoder intended (for EMTV) and to use it (in New Zealand). Australia's copyright law, much older (and therefore far behind the current state of technology) does not address piracy of television services. (3)

Ultimately, copyright violation is a matter of sovereign, national, enforcement. If the laws of a country do not make it illegal to break into an encryption system and "steal" programming, it is not illegal in that country. A letter dated late in July addressed to a cable television system operator in PNG "demands" the cable operator "cease and desist" from carrying CNNI programming there. This is the same CNNI we all access on PAS-2, FTA analogue. Why should CNNI, long the leading proponent of free access viewing, ask a PNG cable system, to "cease and desist?" This is the *other* side of copyright.

Remember that programmers all wish to maximise their revenue from use of their service. Yes, CNNI wants maximum viewers (which incrementally translates to higher rates it can charge for advertising). But it needs to provide advertisers with verified audience reach numbers. It can only do this through creating a licensing scheme, country-by-country, and administering that scheme to ensure every viewing home is counted. Cable systems utilising CNNI without an affiliation agreement are not counted.

In the case of PNG, CNNI has entered an agreement with Hitron, a cable operator, making that firm the administrator for the country. The cable system receiving the "cease and desist" letter is a competitor to Hitron and had been denied access to a use agreement for CNNI. In effect, "copyright" becomes a tool in the hands of a business firm in PNG to deny access to competition. And that, perhaps, is the aspect of copyright which most directly impacts the choice of programming and the sources for programming we find on satellite. Copyright began as a system to protect *creators* from unauthorised use of their works. It has become a tool to allow non-creators to stifle competition. And this lays the foundation for the black, grey and white variations in what some label as piracy. By strict interpretation -

piracy /parrasi/ n. 3. the infringement of copyright

would not apply to a PNG cable system receiving and distributing CNNI to its viewers. Why not? First, the CNNI broadcast is FTA so there has been no overt act to decrypt a service without authorisation. Second, unless PNG copyright law expressly extends a right to Hitron to deny service to another cable operator (under an exclusivity clause) of a FTA service, CNNI is on questionable legal ground.

Piracy is theft by overt action. By definition, you cannot "steal" a free to air transmission. International conventions on copyright define signal theft rather precisely and - *by the way* - exclude live news coverage from copyrightable material. If (fill in name of country) is a signatory to international copyright agreements, it cannot enforce a local law that is contrary to the international convention. All of which makes copyright more grey than black as we will see as this report continues next month.

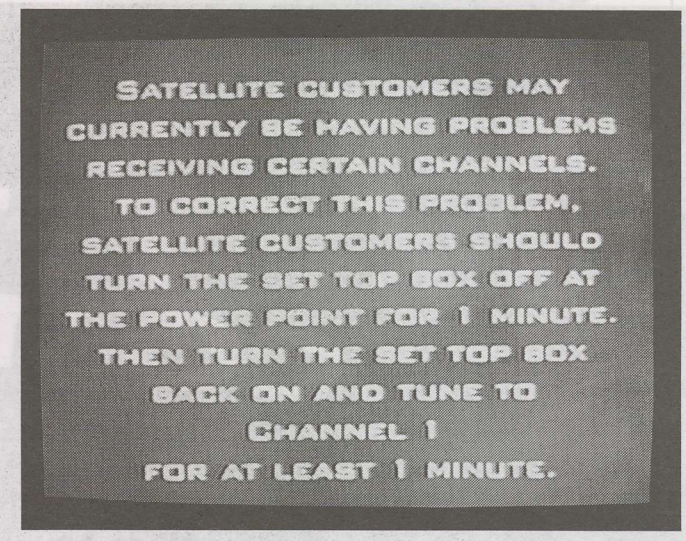
3/ Australia has experienced significant "unauthorised use" of MMDS (terrestrial microwave) services with Taiwanese manufactured MMDS converters openly sold in NSW and Victoria. Galaxy, more recently Foxtel, have attempted to shut down this activity. A Victoria firm, said to have supplied "piracy" Irdeto cards (using European techniques) for use with the former Galaxy service, continues to be the subject of an intense investigation by the security detail at Optus.

The Pieces Are Falling Into Place

UPDATE: Australia's DTH Pay Platforms Evolve

Letters dated August 28 to Austar subscribers advised of impending changes to Australia's largest DTH service, scheduled for October 1. Austar is reconfiguring their channel packages allowing subscribers to take either a BASIC service (18 channels), a (two channel) Movie Package (consisting of Encore and Showtime only), or the "Standard" Package (consisting of 20 channels - see table below). This appears to be in preparation for an announcement by Optus of their own DTH service to become available perhaps as early as November 1.

Austar is adding National Geographic, CNNI and Sky Racing. They are promising additional new channels "over the next 3 months" which partially explains the (temporary) non-use of programme channels 16, 17, 18 and 19 in the "October 1" table below. Austar is adding three new channels, but creating a new 18 channel package consisting of all of the channels shown below *less* Showtime, Encore and the always optional World Movies for the new "Basic Service" rate of $35.95; down $9 from the present $44.95 rate that *includes* Showtime and Encore. In effect, subscribers staying with the present package (and gaining the three new channels as well) will be paying $1.95 per month *more* than at present.



Reconfiguration of three Optus transponders (12.564, 12.626 and 12.688) August 27th created problems for some DGT400 IRDs. Austar posted this announcement (channel 12) to advise users what to do to get their IRDs "back in sync."

AUSTAR Channel Line-Up - October 1

1	Fox Sports	14	CMT
2	Showtime	15	Sky Racing
3	Encore	16	see table on page 18
4	TV1	17	
5	Arena	18	
6	Channel [V]	19	
7	Nickelodeon	20	Cartoon/TNT
8	Discovery	21	BBC World
9	Fox Sports 2	22	CNBC Asia
10	LifeStyle	23	World Movies
11	Comedy Channel	24	TVSN
12	National Geograp	25	CNN Interna.
13	Main Attraction		

AUSTAR Rate Card - effective October 1

Austar Basic (18 channels)	$35.95 p/m
Movie Package (Showtime, Encore)	$10.95 p/m
Austar Standard (inc. Show, Enc.)	$46.90 p/m
Additional outlets - each	$19.95 p/m
World Movies option	$6.95 p/m

Why remove Showtime and Encore from the package? Word is Austar subscribers will have the option of taking a two or three channel Optus movie package in lieu of Showtime + Encore for approximately the same price as Showtime + Encore. Heavy hitters will be offered all five of the movie channels.

Optus spokesmen are freely advising those who contact them that Optus plans its own DTH package official announcement shortly after October 1. Here are the details involved in the present Optus plan.

1) **Ownership**. They will not care what brand, model of IRD you own, only specifying that it be Irdeto capable. Yes - this means present users of DGT-400 (ex-Galaxy, Austar) IRDs could in theory subscribe to some or all of the Optus package.

2) **Smart cards**. Optus plans to distribute their own smart cards through Optus telephone and other outlets. There will be a "purchase" price of $50 per card.

3) **Hardware distribution**. Citing the huge financial losses of Galaxy, and the sizeable investment in IRDs carried by Austar, Optus has decided to not directly be involved in providing IRDs, antennas or installations.

4) **Optus programming packages** will be priced in the range of $15 (per package) to $40 (for a planned 11 channel package). A movie package, as an example.

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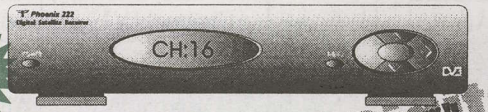

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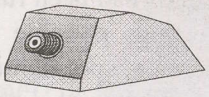

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4,5,6,7 on 12.438 – No √ – Robin

September 7th Programme Channel Identifications From 3 then-operating Transponders

12(.564)			12(.626)			12(.688)		
1	Main Attraction	Aus 13	1	TNT/Cartoon	Aus 20	1	Fox Sport 1	Aus 1
2	CMT	Aus 14	2	BBC	Aus 21	2	Showtime	Aus 2
3	Sky Racing	Aus 15	3	CNBC	Aus 22	3	Encore	Aus 3
4	(Disney)	(16)	4	World Movies	Aus 23	4	TV1	Aus 4
5	(Move 1)	(17)	5	TVSN	Aus 24	5	Arena	Aus 5
6	(Movie Extra)	(18)	6	CNNI	Aus 25	6	Channel [V]	Aus 6
7	(Movie Greats)	(19)	7	ESPN		7	Nickelodeon	Aus 7
8	7Sp1		8	Ovation		8	Discovery	Aus 8
9	7Sp2		9			9	Fox Sport 2	Aus 9
10	Odyssey		10			10	LifeStyle	Aus 10
11	MTV		11			11	Comedy	Aus 11
12	Sky News		12			12	National Geogra.	Aus 12

Note that 12.564 channels 4-7, 12.626 channels 9-12 were not assigned a programme service; however, sources suggest channels 4-7 on 12.564 will ultimately offer the programme services shown in (parenthesis). Also note 12.564 channels 8-12 and 12.626 channels 7-8 are previous Optus (Vision) programme channels. There are therefore 8 programme channels not in use (per Austar October 1 list) plus 7 Optus bouquet channels (Optus channels shaded). Channels presently carried by both Austar and Optus are underlined; note TNT and Cartoon run as separate channels on Optus, but are combined on Austar and Foxtel. (channel data courtesy Robin Colquhoun, Auckland, NZ)

might consist of Movie I, Movie Extra and Movie Greats. An Austar subscriber should be able to take the "Basic" package for $35.95 from Austar and select the Optus Movie Package (one source claims their movie package will be as low as $10 per month - *that* could be when *combined* with other packages).

5) **Discounts**. A second card used at the same location as the initial card "may" get a (small) discount. This would be the "additional outlet" situation. There is no decision on whether satellite dealers buying some quantity of cards at one time (5 is a number mentioned as a minimum) might get a "bulk buy" discount on the initial "$50 *list* price" per card.

6) **Optus is claiming** there will be a "*noticeable increase in signal level*" with their transponders. If Optus plans to reactivate the ex-Galaxy transponders at 12.376 and 12.438 as "home" for their DTH service, they and they alone own the satellites (and control the footprint power levels) that determine on ground signal levels. To capitalise on the RABS connection, it would also be possible for Optus to double-feed their service on a 'high performance' B3 transponder to offer for the first time a package of DTH programming to areas not presently served by the existing 'national' beams of B3 as well as to existing areas but with smaller antennas..

Where on Optus B3 the new Optus DTH service will "fit" is not assured. Compare the table above with the Austar published channel line-up appearing on page 15. There are 8 programme channels (spread over 2 transponders) that were *not* in use at the time of this study, 7 *more* carrying Optus (Vision) programme channel designations. Also note the addition of "Main Attraction" (programme channel 12 on 12.564), which would extend pay-per-view from the present cable-only universe to the satellite homes as well.

Prior to the shutdown of the FTA Optus services (late August), there were only 8 programme channels in that package. Prior to the close-down of Galaxy in May, Optus had been running 16 programme channels FTA. It remains possible for Optus to launch a *limited* DTH service, spot lighting their three movie and 2 or 3 sport channels within the 3 transponders shown above. They do *not* have to reactivate 12.376 or 12.438 to initially be in the DTH business.

Foxtel? Still no decision as to how or when it will break away from Austar (+ Optus). Insiders are quietly suggesting "after November 1st" Foxtel will again accept new subscribers to their service (presently they are accepting no new accounts). The "hints" suggest Foxtel is leaning towards their own encryption format (which means wholesale replacement of the DGT400s they purchased from Galaxy), and towards a PAS-8 platform. This decision is not formal and the "hints" (or leaks) about this may only be subtle attempts to move Optus to a negotiating position which suits Foxtel.

Errata: Foxtel is telling callers, "*negotiations with Optus have broken down*" suggesting Optus is comfortable with their present Austar position.

a technical and marketing advisory

memo

to the membership from your industry trade association

SPACE Pacific

Satellite
Programme
Access
Committ**E**e

A trade association for users, designers, installers, sellers of private satellite-direct systems in the Pacific Ocean & Asia Regions

Greek Update

Further to our July report ("Letter to Greece," p. 20), Paris Cockinos relates an enlarged number of contacts within the Greek television broadcasting industry to "pester" concerning making ERT1 available on some free to air satellite bouquet for the Pacific and Asia. The complete list (people to whom you should address letters, framed after the Cockinos example appearing here in July) now include:

(Mr.) Dimitri Reppas, Minister for Press and Mass Media, 8th Floor, 10 Zalokosta St., Athens 10163, Greece (fax + +30-1-362-0249)

(Mr.) Tassos Mandelis, Minister of Transport and Communications, 13 Xenofondos St., Athens 10557, Greece (fax + +30-1-324-7400)

(Mr.) Gerasimos Moshopoulos, Supervisor Engineer, Department of Satellite, Cable and TV (fax + +30-1-601-2960).

No Opportunity Here

With it becoming increasingly clear Optus, Foxtel and Austar will each be delivering competitive DTH services to many portions of Australia, a major incentive to piracy of Irdeto (or other) CA protected programming services is eliminated. Piracy flourishes in two environments; when there is a *total refusal* to make a service available, and/or when the service is available but in the perception of the marketplace, *over priced.*

That Irdeto has been "busted" is no longer the question. It has, in Europe, and while the technology that undid the Irdeto coding in Europe might not work with the particular Irdeto data security stream in use in Australia, it does not seem implausible that a skilled person who broke it in Europe could not do the same thing in Australia.

The European "solution" to busting Irdeto is complex, and at least at this level of development hardly user friendly. First you need a Pentium speed computer which connects in full, real time to your IRD. The data stream, using software developed by a "team" of Europeans, pushes the Pentium computer to the edge of its capabilities unravelling Irdeto. Logic should quickly tell you it is not cost effective to spend $5,000 for computer equipment to "bust" a $40-50 a month pay-TV service. Irdeto is not worried (although no Irdeto person will discuss the subject nor even admit the words you are reading are accurate). They maintain they can change some data bits, if enough people foolishly installed Pentium computers to unravel their encryption, and that would stop the computer-assisted IRDs. For a while.

News that Irdeto can be violated is hardly news at all because the "solution" is more expensive than buying the service through normal commercial channels. And, it requires computer language skills few possess.

Those who would do this are challenged by *doing* it. They may not even watch TV because they are far too busy overseeing the software that gives their Pentium machine the ability to perform this dastardly chore.

A much more commercially dangerous threat involves "hacking" the smart cards that insert into the receiver's CAM. *Is it possible* to create from a blank piece of plastic a card that fools the IRD and Irdeto data stream into believing the IRD is authorised for reception? The answer to this question is less certain, but evidence

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) each summer in New Zealand. 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.

strongly suggests it would be yes. Certainly in North America, where the DSS system of DTH now has 4 million subscribers, people have been apprehended selling counterfeit "smart cards" and prosecuted for violating the security of DSS.

Counterfeit cards, unlike Pentium class hacker systems, are small enough and familiar enough in appearance to not attract much attention. Hacked cards typically use a real card as a "master" and the counterfeit versions are "cloned" copies. In other words, start with a card that is legitimate and make an exact replica. Down to the unique software card identification. If card number 0004-7227-091 is a paid-for master, create by duplication 100 more just like it. Unlike the Pentium solution, the 100 cards become items in commerce; "slaves" of the original. On a small scale, pirates collect invalid or "lost" cards from legitimate subscribers to use as "slave blanks." Typically, they leave the original imprinted card number (which is no longer valid if the original card has been invalidated) in place on the card. Someone picking up the card has no "visual" reason to suspect it is counterfeit because from all outward appearances it looks, feels and acts like a real card. Inside, the clever bits have been modified by the pirate to contain a cloned set of key numbers duplicating an unrelated legitimate card.

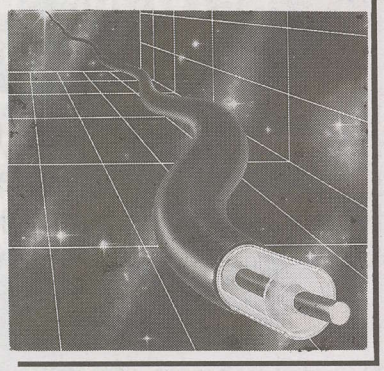
Cloned cards are typically "caught" by old fashioned detective work. Someone "rats" on the counterfeiter (perhaps a jealous competitor), a card gets back to the pay-TV company because a customer has a problem and there the cloning is discovered, or the pirate becomes careless in how he or she markets the product. Most pirate operations limit the number of cloned duplicates from a single master just to cut their losses if one particular master is shut off for any reason. Pirates call cloned replicas of an original "cells" and a cell may have 10 to 100 cloned cards all keyed off of one master.

A cloned card is quickly identified with a card reader. If the external imprinted number does not agree with the internal numbers seen only with a card reader, the card is a phoney. Worse yet, the number identified inside is a direct link to the "master" and leads the pay-TV provider straight to the location of the master. Experienced pirates pay for a year in advance for a card, stick the card in a safe place and never go near the original "IRD location of record" after getting the card authorised. In that way, if a card is "busted" the trail from the pay-TV firm's subscriber records leads the pay-TV cops to a blind alley.

Which gets back to plain old detective work. "*Who lived here six months ago? Do you have a forwarding address? Did they have any visitors, leave any mail, pay be cheque?*" Being a pirate is a risky game, and now that the major Australian players have come to their senses, quite unnecessary!

The line between personal experimentation and piracy is a thin one. Play if you will, just don't *sell* your results.

The CABLE Connection



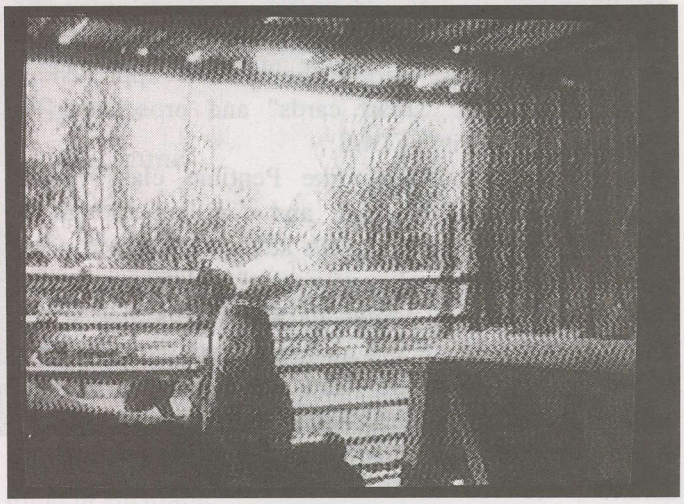
Heat - The Enemy

Two or more cable TV line amplifiers operated "in series" are said to be "in cascade." That simply means one amplifier follows another, separated by an appropriate amount of cable (loss). Outdoor cable line amplifiers fall into two general categories: Mainline (trunk) amps and line extender (feeder line) amps. The main cable line, the trunk, is used for long distance transport of the cable spectrum. Feeder lines are used for individual home connections. In a small system (typically ten or fewer amplifiers in cascade/series), the feeder and trunk can be combined into a single cable. In longer plants, you don't want to "tap into" the trunk for individual home service because to do so raises a risk that some problem related to a single home could end up disrupting reception for many homes on the system (connecting homes through a feeder line, separate from the trunk, adds a degree of "isolation" between individual homes and the mainline "pure" signal).

Aluminium (or standard) coaxial cable has an amount of signal loss measured in dBs per increment of measurement (such as per 100', 100m). Standard cable data sheets tell you the loss at a specified frequency and for a specified cable temperature. It is often overlooked that all coaxial cable has *greater* loss when the cable is warm, *less* loss when the cable is cool.

Normal cable runs for DTH installations are short (under 50m) and may be buried (in the ground). Cable that is exposed to the bright sunlight soaks up heat and at L-band frequencies (the satellite IF range from 950 to 2150 MHz) a mid-afternoon sun can easily raise the cable loss at these frequencies by 10 to 20%. Cable systems operating at far lower frequencies (50 to 550 MHz/750 MHz) in the same amount of sunlight will also experience an increase in cable loss, but as loss is always a function of frequency, the dB increase in loss because of cable heating is smaller.

Cable does not have to be in direct sunlight to absorb heat; running through the attic of a motel, for example, in an SMATV system is equally troublesome if the attic becomes unbearably hot during the daytime. Cable "heat loss" can amount to several dB per 100m at 550 MHz in a hot attic. In a cable plant where the cable is out of doors, black jacketed cable absorbs heat directly from the sun. And while there may be only 350-400m of cable between mainline amplifiers, in a ten amplifier cascade there is 3500-4000m of exposed cable. If the



It looks like a weak signal. It is not. "Wormy" appearance caused by imbalance in line amplifier (see text).

Same cable system - same point in time. Totally clean channel unaffected by problems shown in photos immediately above and below.

Totally different effect - same point in time, same cable system. Horizontal streaking created by imbalance in amplifier automatic gain circuits.

added heat increases the cable loss in each 350-400m run by 0.5dB at 550 MHz, after ten such cable spans the cumulative additional loss because of heat becomes 10 x 0.5 dB or 5 dB. This means that progressively, amplifier to amplifier, the 550 MHz signals are arriving at the next amplifier progressively lower in level below their unheated cable levels (i.e., such as at 28C). The additional loss accumulates, and sooner or later reaches a point where the cable amplifiers are receiving signal levels below the normal design levels.

The normal design approach to this challenge is to place a temperature compensating circuit inside amplifiers in the cascade. It is seldom necessary to compensate each and every amplifier; every third, fifth or event tenth (depending upon the amplifier design and cable plant layout) is typically sufficient.

In the three photos shown to the left, a malfunctioning temperature compensation circuit is creating amplifier overload on one channel (bottom picture) and driving the amplifier into a form of internal self signal generation (top photo). This is in an 80 channel cable plant where the temperature compensating circuits have run amuck. The lower frequency channels (near 50 MHz) appear as in the lowest photo, the highest frequency channels (near 550 MHz) appear as the top photo while those in the middle (near 250 MHz) remain more or less normal (middle photo).

Temperature compensating circuits built into mainline amplifiers typically *do not* function with the abruptness of a switch; in the flick of a eye the pictures degrade from totally normal to suddenly degraded, and then moments later back again to normal as the temperature compensation cycles on and off while tracking the temperature through a probe at the amplifier housing. While the temperature hovers near the preset switching point, the probe is alternately heated and then cooled by a breeze or switched on and off as the sun hides behind a cloud and then pops out again.

There are corrective solutions to this, of course, and this example must be properly labelled as a *malfunction* of an otherwise acceptable technology. Normally, the temperature compensation raises or lowers the gain in small sub-dB (fractional) amounts as the temperature probe senses the relative temperature at the cable or amplifier. In the example recorded on film here, the circuit was switching from full on to full off with subtly of a hammer. But it dramatically illustrates how sometimes a system created to correct a problem can actually produce a new, worse problem than the original one.

As a rule of thumb, if a cable run is under 100m, even if exposed to bright sunlight or attic incendiary temperatures, you can ignore the additional loss of "heated cable." However, it would be wise to keep in mind that heated cable has more loss than normal temperature cable and if you run into a cyclic problem that seems to be more pronounced when it is hot, suspect a possible cable problem.

Further, if a cable run is very long (as in a cable TV plant) and installed so as to react to normal daytime/night-time temperature variations, you cannot ignore the possible adverse effects of temperature on the cable. Just as "heated cable" increases in attenuation, a cable cooled to 0C or below will *reduce* cable loss. This results in *more* signal at the end of a run, increasing the chance of overdriving subsequent amplification equipment. The bottom photo on the left would represent too much signal to an amplifier input, resulting in the generation of amplifier interference. Yes, in this special case it was caused by too much heat and an amplifier over responding to the circuit's perception of a need for added gain. However, TV pictures through an amplifier that is being subjected to an excessive input signal level will produce the *same* horizontal lines in the picture as shown in the lowest photo - the precise effect when cable is cooled to the point where attenuation drops significantly.

Finally, there is the matter of temperature effects on amplifiers. Cable is passive and its loss is related in a linear way to the cable temperature environment. An amplifier generates its own heat, which is conducted away from the circuits with metal cooling "fins." Component parts within an amplifier have their own temperature boundaries and heat in particular will change the way a resistor resists, a capacitor conducts, a transistor amplifies. SMATV amplifiers should never be installed in a location where air circulation is impeded (against a rafter or in a "dead air corner" in an attic). If an amplifier runs too hot to touch when installed, it is in the wrong location and should be moved.

SatFACTS Pacific/Asian Region Orbit Watch: 15 September 1998

Analogue Free-to-Air 57E to 80E

DD1	**55E/2DT** 1330/L
Sun Music	**57E/703** 1395/R
RTNC	1352/R
Gemini	1220/R
AsiaNet	1170/R
WorldNet	1095/R
TVi	1025/R
Muslim	975/L
Tests	**66E/704** 1385/R
Mongolia	1135/L
Home TV	**68.8/Pas4** Vt/1310
ABN	Hz/1365
BBC W	Vt/1286
Sony TV	Hz/1240
Maharishi	Vt/1243
Maharishi	Hz/1218
Doordar.	Vt/1116
CNNI	Hz/1065
TNT/Cart.	Hz/1040
MTV Asia	Hz/965
TVB-8 promo	**76/Ap2R** 1390/Vt
TVT	**78.5/Th3** 1280/Vt
Army TV	1390/Vt
MRTV	1460/Vt
Mynamar	1465/Hz
RAJ-TV	1510/Vt
Test/Army	1614/Vt
Tests	1630/Hz
RAJ-TV	1655/Hz
ATN	1674/Hz
TK Rossija	**80/Exprs.** 1472/L
VTV4+	1275/L
ACT/TB3	1225/L

Anal. Free-to-Air 80E to 113E

Russia 3	**80/Exprs** 1025/R
RTR 1	**90/S6** 1475/R
Orbita I	1275/R
RTR II	1234/R
Orbita II	1215/R
VTV4	**91.5/Me1** Hz/1440
RTM1	1270/Hz
Metro	**93.5/In2b** 987/Hz
National	1022/Vt
DD9	1080/Hz
DD.7 (T)	1070/Vt
DD.9(K)	1180/Vt
DD.1	1268/Vt
DD.	1310/Vt
DD.4	1388/Vt
ORT 1	**96.5/S14** 1475/R
Madagas-car ++	1325/R
Tv Azer.	1275/R
ERTU Egypt	**100.4/As2** 1508/Hz
Test Card	1490/Vt
Feeds/Iran	1470/Hz
Feeds #	1290/Vt
WorldNet	1265/Hz
CCTV4	1190/Hz
RTPi	1170/Vt
RTR	**103/S21** 1475/R
Vrk/Apt	1275/R
TVRI	**108/B2R** 1150/Hz
TPI	**113/C2** 967Vt
TV5	990/Hz

Polarisation?
/L is left hand circular, **/R** is right hand circular, **/Vt** is linear vertical, **/Hz** is linear horizontal.

Anal. Free-to-Air 113E to 148E

Brunei, feeds	**113/C2** 1010/Vt
MTV Asia	1030/Hz
Herbalife (2100 HKT)	1070/Hz
TV Indosiar	1090/Vt
CNBC	1110/Hz
ANteve	1130/Vt
SCTV	1190/Hz
TV3	1250/Vt
ATV(7) Australia	1270/Hz
TVRI	1310/Hz
Gujarat +	1350/Hz
RCTI	1408/Vt
Moscow	**122/As-G** 1475/L
Test Card	**128/Jc3** 1070Vt
Test Card	1170/Hz
CETV SD	**134/Ap1A** 1330/Hz
CETV2	1250/Vt
CETV1	1170/Vt
CCTV7	**138/Ap1** 990/Hz
Orbita-I	140/**S7** 1475/R
ORT1	**145/S16** 1475/R
RTR Russia	1275/R
GMA	**146/Ag2** 1363/Hz
Test Card	**148/Me2** 1070/Hz

Worldstar Radio Sat
Asiastar 1 to 105E (01/99); downlink 1.451-1.492 (GHz). Audio channel capacity: 576 @ 16Kbit/s.

- Check for wildcard feeds

An. Free-to-Air 150E to 180E

RCTI	**150/C1** 990/Hz
NHK analogue	**169/Pas2** 1090/Vt
CNNI	1150/Vt
Feeds #	1370/Vt
Feeds #	**174/I802** 984/R
Feeds #	973/R
Feeds (KBS)	**177/I702** 984/R
Feeds #	963/R
Feeds #	**180/I701** 1340/R
RFO	1309/L
Feeds #	1220/R
Feeds #	1175/R
Feeds #	1090/L
Feeds #	1020/L

PALAPA C1

Tests	990Hz
Tests	1140Hz
Tests	1220Hz
Tests	1330Hz
Tests	1360Hz

C1 not recently reported

Encrypted Analogue

Discov. India	**68.8/Pas4** 1365/Vt
ESPN	1290/Hz
HBO Asia (d) *	**113/C2** 1150/Hz

* was scheduled to move to Ap2R. digital switch August 15th.. still active

NON MPEG-2 DIGITAL SERVICES

People's Net (GI 1.5)	**113/C2** 1220/ Hz
RPN-9 (SA 1.5)	**142/G2** 1225/L
Fox/ Prime (SA 1.5)	**169/ Pas2/** 1161/Vt
Filipino Channel (GI 1.5)	1314/Hz

Frequencies Given in these charts are in C and Ku band IF. To calculate C-band RF, take IF given and subtract from 5150; for Ku-band using 11.300 LNB add IF given to 11,300. I.e., 5150-1508 = 3642 while 1358 + 11,300 = 12,658. (Tks-Mad Greek)

September Alert

Possibly means nothing - but JCSAT3 test card (4080/1070Vt) back again at 128E; may pay to keep an eye on it. Probably not watchable south of equator - ST-1 (Singapore) now at 88E and testing; will conflict with ChinaStar 1 at 87.5E. 110E: No reports to presstime of SinoSat testing but reported on station early August. Ku - watch Optus B3, 12.376(Hz) & 12.344 (Vt) for possible reactivation as Optus DTH platform.

53.2	55	57	66	68.8	76	78.5	80	87.5	93.5	96.5	100.4	103	107	108	113	122	128
S27	2DT	703	704	Ps4	Ap2	Th3	Ex2	Cs1	Me1	In2B	As2	S21	Ct1	B2R	C2	As-G	Jc3
C	C	C	C	C	C	C	C	C,Ku	C	C	C	C	S	C	C	C	C,Ku

134	138	(139)	140	145	146	148	151	152	156	160	161	(166)	169	174	177	180	148W
Ap1A	Ap1	(Or3)	S7	S16	Ag2	Me2	C1	A3	B3	B1	Mb1	(Ps8)	Ps2	801	702	701	Es4
C	C	C,Ku	C	C	C	C	C	Ku	Ku	Ku	C	C,Ku	C,Ku	C	C,Ku	C	Ku

OPTUS B3 156E (Ku only)

Austar Mpeg 2	1388/Hz
ABC WA	1358/Vt B-MAC
Imparja	1355/Vt B-MAC
Austar Mpeg2	1326/Hz
GWN (to Sept.)	1300/Vt B-MAC
Net 9, Sky	1233/Vt B-Mac
Austar Mpeg 2	1264/Hz
BMAC	1230/Hz
School tv	1170/Vt
Aur. Test	1107/Vt
Imparja	1040/Hz B-MAC

Optus A3/152E(a)

ATN7png	1297/Vt
ATN7png	1430/Vt

a/occasional use

Palapa C2 Ku (seen South equator)/113E

Test bars	11.148/Vt

MeaSat 2 148E

Tests	1070/Hz*

* Colour bars , audio 6.8; C-band covers Aust. NZ

OPTUS B1 160E (Ku only)

RHEF /NZ feeds	1430/Hz
Data	1402/Hz
QSTV	1377/Hz B-MAC
SE ABC HACBSS	1370/Vt B-MAC
SE SBS HACBSS	1344/Vt B-MAC
NE SBS HACBSS	1339/Hz B-MAC
NE ABC HACBSS	1313/Hz B-MAC
Sky Channel	1296/Vt B-MAC
ABC Radio	1276/Hz (digital)
OmniCast	1270/Vt (FM/FM)
ABC fds	1247/Hz
Sky Nz (sport)	1245/Vt VidCrypt
Net 9 feeds	1220/Hz B-MAC
Sky Nz (Sky 1)	1218/Vt VidCrypt
Net 10	1182/Vt E-Pal
Net 9	1180/Hz E-Pal
Net 10 feeds	1155/Vt Pal
QTQ9	1145/Vt
TSS Nz & Sky Nz digital	1118/Vt
Sky Nz digital	1091/Vt
7 Net	1086/Vt E-PAL
Aurora MPEG-2	1076/Hz (tests)
CAA air to ground	1009/Vt Nbfm

PAS-2 169E (C + Ku)

CCTV	1433.5/Vt (PowVu)
Feeds-#	1407/Hz
Discovery PowerVu	1374/Hz (PowVu)
AB Asia, feeds-#	1335/Vt
ABS/CBN	1314/Hz (GI 1.5)
CNNI (1/2 Tr)	1250/Vt
MPEG-2 PowerVu	1249/Hz (PowVu)
FoxSports	1160/Vt (SA 1.5)
Feeds-#	1150/Hz
Feeds-#	1120/Vt
NHK (digital)	1115/Hz
NHK anal.	1090/Vt
NBC Mux MPEG	1057Vt (Philips)
MPEG-2 PowerVu HonKong	1002/Vt
TCS Sing.	967/Hz

PAS-2 Ku

GWN	12.263V
Telstra Bendigo	12.300V
Napa TC	12.415V
MTV Asia	12.604V (MPEG)
ABC Interchge	12.629, 638, 646 /Vt
MediNet	12.655V

Intelsat 801 174E

Feeds-#	963/R
Feeds-#	984/R

Intelsat 702 177E

Feeds-#	963/R
AFRTS	973/L (PowVu)
Feeds-#/ KBS	984/R
Space TV Sys ?	12.612H (MPEG)

Intelsat 513 177W

Feeds-#	963/R
Feeds-#	984/R

(513 Ku)

Service	RF Freq.
US Nets	10.980V
NBC	11.015V
Feeds	10.510V

Ku Services
Intelsat Ku band services shown here are boresighted to Japan and nearby Asia, have not been reported south of equator.

- check for wildcard feeds

Intelsat 701 180E(W)

TVNZ	955/Dmv 3000
TVNZ	964/Dmv
TVNZ	972/Dmv
TVNZ	980/Dmv
TVNZ	988/Dmv
Occ Vid.	1,020**
TVNZ	1,030
RFO +	1055**
SPN	1,069
Feeds-#	1,090**
SCPC	1,126
SCPC	1,136
Vidip/(e)	1220-#
Feeds-#	1,254
NHK(e), NBC	1,270
TVNZ	1,293/e
RFOanal	1,309**
Feeds-#	1,340
10 Oz MCPC	1,385 (PowVu)
CNN USA(e)	1430

* RHC & LHC
** LHC only
e/ encryption

(701 Ku)

NHK	11.135H
CBS	11.475H
CNN	11.508H

UPCOMING SATELLITE LAUNCHES

Orion 3 to 139E; now October 1 / C + Ku
PAS-8 to 166E - October 29 / C + Ku
Insat 2E - November 13
JCSAT6- rescheduled to December 1 / Ku
ChinaSat 8 - January by Long March launcher
Gorizont 33 to ??? - January
AsiaSat 3s - March 1 / C + Ku
Intelsat K-TV to 95E - March - high power Ku

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 September 1998

Bird	Service	RF/IF & polarity	# Prog channels	FEC	Msym	Interoperable Receivers
I703/57E	Sky News	4187/963RHC 4140/1010RHC	1 1	3/4 3/4	5(.632) 5(.632)	unknown
	CNBC	4018/1132LHC	1	3/4	6(.000)	unknown FTA (NE zone beam)
I704/66E	TV5	4055/1095RHC	4	3/4	27(.500)	Virtually any FTA receiver
	Indian bouquet	4068/1082LHC	2(?)	1/2	7(.100)	HS-100C, e3
	Sky News +	3805/1345RHC	2+	3/4	22(.520)	unknown but FTA at this time
PAS4/68.5E	ART/ BBC	3980/1170Hz	2	3/4	5(.632)	e3
	TVSN + TFC+	3743/1407Hz	6	3/4	21(.800)	(MPEG-2, Iredeto) (some CA)
	CCTV	3716/1434 Hz	6	3/4	19(.850)	Virtually any FTA receiver
Ap2/76E	AXN	3600/1550Hz	8	7/8	28(.340)	(inactive?)
	Reuters	3636/1514Hz	1	3/4	5(.632)	(inactive?)
	TVB 8	3680/14701Hz	2+	3/4	13(.240)	PowerVu (CA likely)
	Hallmark/Kermit	3720/1430Hz	4TV	3/4	19(510)	PowerVu, may now be CA
	Plus 21 (Adult)	3787/1363Hz	1	3/4	6(.110)	PowerVu Sept. start/CA
	Disney	3880/1270Hz	3	5/6	28(.125)	PowerVu CA
Thaicm 3/78.5E	UTV	3920/1230Hz	6TV(**#1**)	3/4	26(662)	Mostly CA
	UTV/MCOT	3880/1270Hz	8TV(**#2**)	3/4	27(.500)	Mixed CA and FTA
	Reuters Feeds	3636/1514Hz	1TV	3/4	5(.632)	Nokia e3, probably others
	Thai 5 Bouquet	3600/1550Hz	8TV	3/4	26(.662)	Nokia e3, probably others
Measat 1/91.5	India Bouquet	12284/12346Vt	10+TV?	7/8	30(.000)	Philips
As2/100.5E	Chinese tests	12.295Hz 12.329Hz	1TV 1TV (BTV 1)	2/3 1/2	6(.103) 6(.930)	HS100C, e3
As2/100.5E	Laos TV	4143/1007Hz	1TV	2/3	2(889)	Virtually any SCPC receiver
	Euro. Bouquet	4000/1150Hz	6TV, 1r. (**#3**)	3/4	28(.125)	Any DVB receiver
	Hubei /HBTV	3854/1296Hz	2	3/4	4(.418)	Virtually any SCPC receiver
	Hunan TV/SRTC	3847/1303Hz	1	3/4	4(.418)	Virtually any SCPC receiver
	GuandongGDTV	3840/1310Hz	1	3/4	4(.418)	Virtually any SCPC receiver
	Inner Mongolia TV Zizhiqu	3828/1322 Hz	2	3/4	8(.397) (1-China) (2-Mongolia)	Virtually any SCPC + MCPC receiver
	APTV London	3800/1350Hz	1	3/4	5(.631)	DMV, HS-100C, N163 /17X/2X
	BBC Radio	3793/1357 Hz	?	?	?	(Custom to BBC by RNET)
	WTN Jerusalem/ London	3790/1360 Hz	1	3/4	5(.631)	DMV, HS-100C, N163/17X/ 2X
	WTN London	3786/1364Hz	1	3/4	5(.631)	Mostly CA now
	WTN HK	3775/1375 Hz	1	3/4	5(.631)	Virtually any SCPC receiver
	WTN Moscow	3770/1380Hz	1	3/4	5(.632)	Virtually any SCPC receiver
	LiaoningTV/Svc2	3734/1416Hz	1	3/4	4(.418)	Virtually any SCPC receiver
	Jiangxi /JXTV	3727/1423Hz	1	3/4	4(4.18)	Virtually any SCPC receiver
	Fujian /SETV	3720/1430Hz	1	3/4	4(.418)	Virtually any SCPC receiver
	Quinghai TV	3713/1437Hz	1	3/4	4(.418)	Virtually any SCPC receiver
	Henan TV Main	3706/1444Hz	1	3/4	4(.418)	Virtually any SCPC receiver
As2/100.5E	Sky Racing	4020/1135Vt	3TV	1/2	18(.000)	Pace DVS-211 (CA)
	EMTV	4006/1144Vt	1TV, 2 radio	3/4	5(.632)	(now) CA: PV9234
	KIBC	3940/1210Vt	1TV, 4 aux.	2/3	26(.655)	HS-100C (2.05), e3 (V5.0)
	STAR/ ISkyB	3900/1250Vt	19TV w/3744	7/8	26(.845)	Now all CA (Pace DVS211)
	Hei Long Jiang	3834/1316Vt	1TV	3/4	4(4.18)	Virtually any SCPC receiver
	JSTV	3827/1323Vt	1TV	3/4	4(.418)	Virtually any SCPC receiver
	AHTV	3820/1330Vt	1TV	3/4	4(.418)	Virtually any SCPC receiver
	Shaanxi/"QQQ"	3813/1337Vt	1, 1 Radio	3/4	4(.418)	Virtually any SCPC receiver
	Guangxi GXTV	3806/1345Vt	1, 1 Radio	3/4	4(418)	Virtually any SCPC receiver
	Eastern TV Taiwan	3785/1365 Vt	5TV (**#5**)	3/4	18(.000)	Pv9223 (CA)

Bird	Service	RF/IF & Polarity	# Prog. channels	FEC	Msym	Interoperable Receivers
(As2/100.5E)	Myawady TV	3766/1384Vt	1TV	7/8	5(.080)	HS-100C (PIDs now 1062/1063)
#	Japan Tel (feeds)	3765/1385Hz	1TV	3/4	5(.632)	Virtually any FTA receiver
	ISkyB	3744/1406Vt	19TV w/3900	7/8	26(.845)	Pace DVS-211 (CA)
	Star TV Sports	3700/1450Vt	5TV	3/4	27(.500)	Pace DVS-211 (CA)
Ca1/107.1E	Cakrawarta 1	2.540 GHz (+)	6TV	5/6	20(.000)	Thompson/RCA (CA)
C2/113E	Tests	11.500Hz	multiple TV	7/8	26(850)	Pace DVS-211 (CA)
	Indonesia	3820/1330Vt	6TV+ **(#5A)**	3/4	26(.661)	Initially - virtually any FTA
	Star Indovision	3500/1650Hz	20 TV(**#7**)	7/8	26(.850)	Pace DVS-211 (CA)
	unknown	3762/1288Hz	5TV(?)	3/4	12(.857)	(apparently) CA
	MegaTV	3780/1370Vt	5TV (**#8**)	3/4	27(.500)	Unknown (CA)
	MTV test (?)	3860/1290Vt	1TV	3/4	6(.198)	if still FTA, virtually any IRD
	SCTV feeds	4082/1068Hz	1TV	3/4	6(.160)/6(.248)	if FTA, virtually any IRD
Thaicom 1/120E	Thailand terres.	4120/1030Vt	6TV	2/3	27(.500)	unknown
	ITV Thailand	3760/1390Vt	8TV			unknown
AP1/138E	Reuters	3732/1418Vt	1TV, data	3/4	5(.632)	N163/17X/2X
	CNNI + Cartoon	3980/1170Vt	2+ TV	3/4	26(000)	(CNN clear) / unknown
Optus B3 156E	Aurora Test	12.407Vt	10TV, 7radio (loading varies)	2/3	30(.000)	Irdeto CA - tests (UEC 642 with card)
	OptusVision test	12.564,626Hz	8TV (**#9A**)	3/4	29(.473)	FTA for testing only
	Austar	12.564 (.626, .688)	18 TV, 8 radio **(#9B)**	3/4	29(.473)	DGT400 CA (all now CA)
Optus B1 160E	Aurora (MPEG test)	12.377Hz	5+ TV	2/3	30(.000) [27(.500)]	N163/17X/2X, Pv9223, HS-100C
	Sky NZ Tests	12.391Vt 12.418Vt	7 + 7 TV, 4+ audio	3/4	22(.500)	NDS CA (new Pace IRD; model # unknown)
PAS-2 169E	Mediasat	12.655Vt	1TV	3/4	6(.610)	virtually any IRD
	ABC Interchange	12.646 (.638, .629)Vt	1 TV (each)	3/4	6(.980)	Pv9223, Hs100C, e3
	Telstra Bendigo	12.300Vt	3TV, 2 radio	1/2	10(.138)	Pv9223/9234, (CA)
	GWN Perth	12.265Vt	2TV, radio	1/2	16(.200)	Pv9223, 9234 (CA)
#	Hong Kong PVu	4148/1002Vt	8TV (**#12**)	2/3	24(.430)	Pv9223, HS-100C(*), N2X*
#	NBC Hong Kong	4093/1057Vt	5 TV(**#13**)	3/4	29(.473)	Most FTA receivers; CA soon?
	JET Singapore	3962/1188Vt	2TV	1/2	13(.740)	Pv9223 (CA)
(avoid ch 8, 9!)	ESPN (USA)	3860/1290Vt	7TV, 2 control	7/8	26(.470)	Pv9223 (CA)
	ART America	3778/1372Vt	up to 8TV **(#13A)**	2/3 7/8	6(.618) 23(.695)	1 ch test 6(.618) with expanded 8 ch service to launch
	Service 1	3761/1389Vt	1 TV	3/4	6(.620)	virtually aby FTA receiver
	CCTV China PwrVu	3716.5/ 1433.5 Vt	5TV (**#14**)	3/4	19(.850)	Pv9223, HS-100C, N163/17X/2X (FTA)
	TCS Singapore	4183/967Hz	2TV(**#15**)	1/2	6(.620)	Virtually any FTA receiver
#	ITJ- J.Telecom	4.174/976 Hz	1 TV	3/4	5(.632)	HS-100C
	AAR-ART//RAI	4151/999 Hz	3TV(**#16**)	3/4	5(.632)	Virtually any FTA receiver
#	Feeds	4138/1012Hz	1TV	3/4	6(.620)	HS-100C, e3
	NHK Joho	4035/1115Hz	5TV **(#16A)**	3/4	26(.470)	1CA/D9234; 2-FTA HS-100C +
#	PAS-2 feeds	3940/1210 Hz	2TV(NTSC)	2/3	6(.620)	Virtually any FTA receiver
#	NAPSA(t)4	3940/1210Vt	2+TV, 1 data	2/3	7(.498)	Virtually any FTA receiver
#	California PowerVu	3901/1249Hz	8TV (**#17**)	3/4	30(.800)	CA PV9223; FTA virtually any receiver (some with NTSC glitch)
	Disney/Aust.	3804/1346Hz	3TV	5/6	21(.093)	Pv9223 (CA)
	Discovery Singapore	3776/1374 Hz	7TV (**#18**)	3/4	21(.093)	Pv9223, HS100C, N2X (occasionally Ch. 2 FTA)
	Satcom 1-6	3743/1407Hz	6TV	7/8	19(.465)	Pv9223(CA)
I702/177E	AFRTS	4177/973LHC	8TV, 12 rra.(**#19**)	3/4	28(.000)	Pv9223 (CA)
(Off air?)	SPACE TV	12.612/1312Hz	10TV,9 radio	3/4	26(.694)	XTCCDTV200

SatFACTS MPEG-2 Digital Watch: 15 September 1998 ◆ Support Data

Bird	Service	RF/IF & polar.	# Prog. Chs	FEC	Msym	Interoperable Receivers
1701/180E	TVNZ Gennet (feeds)	4195/955RHC 4186/964 4178/972 4170/980	1TV(CA) (BBC Gennet) 1TV(CA) (APTV/Tokyo+)	3/4	5(.632)	DMV, HS100C, N17X, 2X, e3 (for non CA channels when active; not all channels active all of the time).
	Americas(radio)	4175/975LHC	3+ radio (?)	2/3	3(.680)	Receiver unknown (CA)
	TVNZ CRY	4120/1030RHC	1TV	3/4	5(.632)	(see TVNZ above)
	RFO-Canal +	4095/1055LHC	7TV, 5 rad.**(#21)**	3/4	27(.500)	MPEG-2, 2-CA, 3 FTA
	SPN Nauru	4081/1069RHC	1TV	3/4	4(.730)	HS-100C, e3
(limited hours)	Baccarat Game	4028/1122RHC	1TV	5/6	2(.702)	Hyundai 2.25, others likely
	Prime TV (NZ)	4024/1126LHC	1TV	2/3	6(.870)	PowVu (CA)
	TVNZTL	3854/1293RHC		3/4	5(.632)	HS100C, e3 (now CA)
	10 Australia	3765/1385RHC	6TV	7/8	29(.900))	Hs100C, e3, Pv9223 (4ch CA)

Bouquets: **1)** Thailand UTV: (Now all CA); **2)** Thailand UTV/MCOT: (Disney, TNT/Cartoons FTA; rest CA) **3)** European Bouquet. (1) **Deutsche Welle**, (2) **MCM**, (3) **RAI International**, (4) **RTVE**, (5) **TV5 Paris**; Radio (1) **DW#1** (stereo), (2) **DW#2 & 3**, (3) **DW#4 & 5**, (4) **YLE** (left) & **RCI** (right), (5) **WRN** & **test**, (6) **REE**, (7) **RF#1**, (8) **RF#2**, (9) **RFI Music**, (10) **RNW**, (11) **RAI**, (12) **NN**, (13) **SRI**; **4)** STAR TV Hong Kong. (Now all CA); **5)** Eastern TV Taiwan. Now all CA except occasional (5) RockTV/TTV; **5A)** Indonesia Bouquet. , (1) RCTI, (2) TPI, (3) CNNI, (4) CNBC, (5) MTV Asia, (6) TV5 Asia; **7)** Indovision. 20 channels operating at last report, all CA; **7A)** Indonesian Bouquet: (6 terrestrial TV services **FTA** on DVS-211 receivers [transponder reaches South Pacific as well]; **8)** MegaTV (all CA) **9A)** Optus Vision tests,as of 07-09-98 (temporarily - spread between 12.564 and 12.626 with promise of 12.376 during October) ; **9B)** Austar (*encrypted* as of August 5) (1) Fox Sports, (2) Showtime, (3) Encore, (4) TV1, (5) Arena, (6) Channel <v>, (7) Nickelodeon, (8) Discovery, (9) Fox Sports II, (10) Lifestyle, (11) Comedy Channel, (12) National Geo., (13) Main Attraction, (14) CMT, (15) Sky Racing, (16) [Disney] (17) [Movie 1] , (18) [Movie Extra], [19) [Movie Greats], [20] TNT/Cart., [21] BBC, [22] CNBC, [23] World Movies, [24] TVSN, [25] CNNI; 11 radio (8 CD stacker fed); **9C)** Foxtel tests: currently inactive. **12)** Hong Kong PowerVu. (1) CTN 1, (2) CTN II, (3) TVBI, (4) TNT/Cartoons [PAL], (5) **Ad-hoc II** [NTSC], (6)Ad-Hoc PAL (blue screen), (7) CTN III, (8) CTN IV; **13)** NBC Hong Kong. (1) **CNBC Asia**, (2) **CNBC Australia**, (3) **National Geographic** , (4) **NBC feeds**, (5) **NGS-Taiwan ; 13A)** (1) ART America, (2) ART Movies, (3) LBC America, (4) RAI Int America, (5) LBC Australia, (6) ART Australia, (7) RAI Int Australia, (8) MCM Music Ch; **14)** CCTV China. (1) **CCTV4** , (2) **CCTV3** [(3) **CCTV 9**, (4) **CCTV4**, (5) **CCTV5**, (6) **CCTV8**, **(7) CCTV tests** + radio on extra audio channels ; **15)** TCS Singapore. (1) **TCS Test**, (2) **TCS Default** [repeats channel 1]; **16)** SCPC3. (1) ad-hoc use, (2) **AAR/ART**, (3) **RAI International; 16A)** NHK World (1) **NTSC Jap**, (2) **NTSC Eng**, (3) **PAL Jap**, (4) **PAL Eng**, (5) **NHK radio**, (6) NHK Premium **17)** California PowerVu. (1) **CMT**(NTSC), (2) **Ad-Hoc 1** (3) ART (4) **EWTN** (NTSC) global Catholic radio, ch. 2, (5) **BBC World** (NTSC), (6) **Bloomberg Financial** (NTSC), (7) Golf Channel (NTSC), (8) Animal Planet; **18)** Discovery. Now all CA except occasional (2) **Disc. default**, ; **19)** AFRTS. Up to 19 video, audio, data channels; non accessible (PowerVu CA); this is a very dangerous (Bootloader) place for D9223 receivers to be! **20)** SPACE Systems (177E, Ku)- apparently inactive; **21)** RFO (feeds from France). (1) Canal +(Caledonia), (2) Canal + (Polynesia), (3) **Saudi TV**, (4) **Abu Dhabi TV**, (5) **TOM1/RFO1**, (6) **TOM2/RFO2**, (7) **TOM3**, (8) Radio Abu Dhabi, (9) Ellibera FM, (10) Radio F1-stereo, (11) France Radio Contributions, (12) RFI France.

MPEG-2 DVB RECEIVERS: [Data here is believed accurate; we assume no responsibility for errors in this volatile area!]

AV-COMM R3100. FTA, excellent sensitivity (reviewed SF May 15, 1998). Av-Comm Pty Ltd, tel + +61-2-9949-7417.

Grundig (Gng) DTR1100 (badged Panasat 630, believed no longer in production). Av-Comm Pty Ltd (tel 61-2-9949-7417)

Hyundai-TV/Com. Ceased production of HSS-100 family of IRDs in March. Still in pipeline, model HSS-100B/G (for Pacific) and HSS-100C (for China). Versions in 2.25/2.26 region were good performers, version 5.0 had tuner sensitivity and other problems. Skandia (tel 61-3-9819-2466) has version 3.11, Skyvision Australia has 3.11 with low threshold Nokia tuner (tel 61-2-6292-5850); SATECH (tel 61-3-9553-3399) has version 2.26.

MediaStar D7. Supplier preloaded software known channels, V. 2.09, 2.10 from Opac Pty Ltd. (61-2-9584-1233)

Nokia "d-box" (V1.7X) suitable for C-band use. Instructions, on-screen prompts may be in German. Be careful when buying this one!

Nokia 9200/9500/9600. There are too many Nokia versions to count. The original 9500S software version 1.63 was uniquely capable of going through a satellite and locating digital transponders and placing on the menu screen the Msym. FEC and operating frequency of every digital signal found whether FTA, CA, MCPC or SCPC. Sadly, that ability is gone with newer models. Current version software within 9200/9500/9600 model numbers is 5.0 or higher. Nokia refuses to support distributors in Asia or the Pacific and users are forced to locate and purchase product through European sources. The most helpful and knowledgeable Pacific region supplier for this product is AV-COMM Pty Ltd at tel 61-2-9949-7417. (See this listing, SatFACTS April 1998 and earlier for greater detail.)

PACE DVS-211. Officially available only through Sky (racing) Australia (Bob Pankhurst tel 61-2-9451-0888].

PACE DGT400. Original Galaxy IRD, now owned by Foxtel. For status (within Australia) call HOTLINE 1300-360818.

PACE DVR-500. Apparently no longer current except through NBC to cable, broadcast affiliates; basically DGT400, has CAM ability.

Panasat 520 (Pn520), **630** (Pn630), **635 no longer available**; spares through UEC in South Africa (fax + +27-31-593-370)

Panasonic TU-DS10 for use in Optus DTH platform (1 Nov); Antares Electronics tel + +61-7-3205-7574, Evcom Aust. Pty Ltd 61-2-9316-5055

Phoenix 222. FTA including PowerVu. Exceptional graphics, ease of use. Satech (61-3-9553-3399).

Power-Com. FTA including PowerVu, NTSC and PAL. NetSat (61-2-9687-9903)

PowerVu D9223, 9225, 9234. Scientific-Atlanta (Sydney) Tel 61-2-9452-3388; BaySat (tel 64-6-843-5296), Telsat (64-6-356-2749)

Note: SA D9223 receivers are RISKY to use for enthusiast purposes because of susceptibility to software overwrite during "boot-loading" sequence. Model 9234 is currently distributed in Western Australia for GWN reception under "RTIF" subsidy programme, and for NHK Premium through SA as well as in PNG for EMTV "authorised" sites.

Praxis DigiMaster 9600 MKIIFTA digital (inc. PowVu) + analogue. Skyvision Australia (tel 61-2-6292-5850)

Praxis 9800 ADP FTA digital (inc. PowVu) + analogue + positioner. Skyvision Australia (tel 61-2-6292-5850)

Prosat 2102S. DVB, NTSC and PAL, menu-driven, SCART and RCA outputs. Sciteq Pty Ltd (tel 61-8-9306-3737)

Satcruiser DSR-101 FTA w/PowVu, NTSC-PAL conversion. Skyvision Australia (tel 61-2-6292-5850)

SK888. From Sun Moon Star (DigiSkan) through Skandia Electronics Pty Ltd. (tel 61-3-9819-2466)

UEC 642. Irdeto equipped for Australian RABS services, will also do pay-TV Irdeto services. Nationwide Antennas (61-7-3252-2947).

YURI HSS-100C. Rebadged Hyundai, software 2.27 which is Australian created mod from V2.26. Nationwide (61-7-3252-2947)

WITH THE OBSERVERS

AT PRESS DEADLINE

Austar radio channels: (1) Light Classical, (2) New Age, (3) Radio Italia, (4) Sport 927, (5) Radio Extra, (6) Dance Music, (7) Country, (8) Top 100, (9) Cafe Jazz, (10) Easy Listening, and (11) Classic Hits. Not all audio channels are operational full-time; there seems to be a lack of routine maintenance on this hardware!

Transitions. Observer **Steve Jepson** (Levin, NZ) reports increased activity on Optus B1, FTA analogue (12.730Vt, IF 1430) on NZ beam; Network 10 news feeds are included. Observer **Robert Hepple** (Whakatane, NZ) reports "light sparklies" on 60cm (Sky NZ) dish on feeds here, including music videos.

Observer **Steve Rouse** (Wollongong, NSW) reports "Space TV 12.612Hz (Intelsat 177E) appears to be gone; no signal noted for two weeks starting mid-August." As we first reported in SF#35 (July 1997), this entire operation has been a house of cards with what we determined was a faulty foundation.

Observer **David Leach** (NSW) reports what he believes to be Singapore based ST-1 launched to 88E with test signals (non-video) around 3650/1500. The footprint on ST-1 stops far short of even northern Australia so any reception at all will be very marginal.

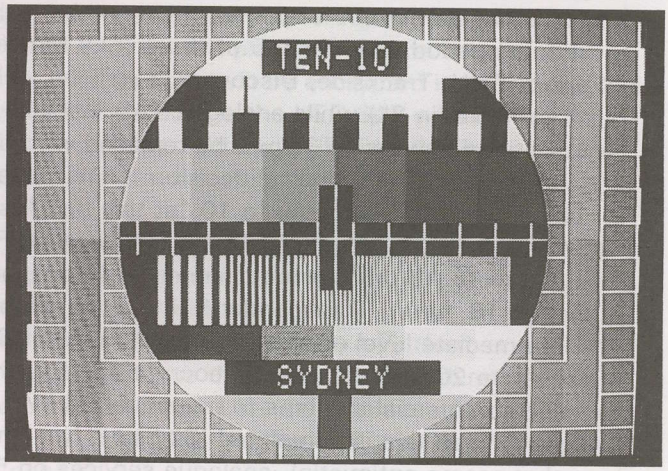
Cakrawarta S-band from 107.1E. Congratulations to observer **Peter Merrett** (WA) for report detailing reception well off coverage beam using 16' with Gardiner S-band LNB and ADL ARS-1 (+ Nokia 9500S). Msym 20.000, FEC 5/6, all encrypted with carriers on 2.536, 2.566, 2.596 and 2.656 (GHz). Last two are definitely vertical, first two would not properly null indicating possible circular. However, references for satellite say it is totally linear. Asian reports say 2.536 has TPI, ANTV, IVM, SCTV, RCTI and TVRI in the bouquet. Looking for S-band hardware? Try Sciteq at (tel) 61-8-9306-3738.

MTV Asia, possibly only for a short test, has been reported on Palapa C2, 3960/1290Vt in MPEG-2 FTA (Msym 6.198, 3/4).

Observer **Tony Drexel** (SA) reports Palapa C2 SCTV "testing" MPEG-2 FTA (4082/1068Hz at Msym 6.160 [others say 6.248] and 3/4). **Robin Colquhoun** (Auckland, NZ) reports seeing feeds but no scheduled programming on this service; not active full-time.

Drexel also reports Maharishi Veda Vision (religious TV) on PAS-4 analogue (3907/1243Vt, 24 hours) as well as running parallel PAS-2 MPEG-2 (12.655Vt, Msym 6.620 at 1/2) early on Sunday evenings. And, Reuters News occasional feeds on PAS-2 Vt 3996/1154Vt at Msym 10.000 and 3/4.

Test card on JCSAT 3 is reported in Queensland 4080/1070Vt. As reported extensively in SF#12 (August 1995), this satellite has considerable 3m dish size capability for Australia, NZ and the Pacific on six transponders of which 4080 sits in the middle of the group. That the satellite has never attracted commercial customers for this footprint is unfortunate.



With Sky (Network NZ) now occupying Optus B1 transponders 3 and 5, occasional (wildcard) feeds from Australia to NZ have moved primarily to 12.733Vt (photo courtesy Steve Jepson, Levin).

"Kermit Channel" has debuted on Apstar 2R (3720/1430IF Hz; Msym 19.510, FEC 3/4) within combined Hallmark bouquet. Service launched September 1 with 3-hour cycled (repeating) Muppet package, expanded September 14th to 6 hour (repeating) block; sometimes FTA. On October 1, 24 hour service is scheduled. Bouquet consists of four video channels: 1-Hallmark PAL, 2 - Hallmark NTSC, 3 - Kermit PAL, 4 - Kermit NTSC (**Jacob Hendriks**, Tasmania, others).

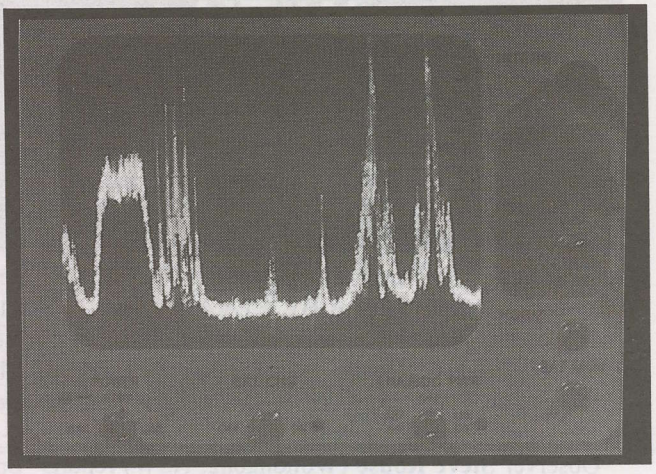
TVB 8 service (Hong Kong) is now being shown in temporary FTA format on Ap2R (3760/1390Hz), PAL. Service is giving "free preview" with plans to convert to non-specified MPEG-2 digital format around 1 October. They are looking for "Chinese audiences" but do not specify whether individual homes will be accepted. Contact: Danny Cheung, fax ++852-2358-3227.

No reports - hope springs eternal. Echostar 4 at 148W is functional, have you done a search to see if it is visible at your location? Yes, beam is to North America but there is at least possibility some Pacific locations would receive "fortuitous"

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 October15th issue: October3 by mail (use form appearing page 34), or 5PM NZT October 4th if by fax to 64-9-406-1083.

Status Report - Launch of Sky NZ Digital

Sky, anticipating first shipment of Pace IRDs for their new NDS non-MPEG-2 compliant digital service in October, has announced the following plan. Using transponder 3L and 3U, ten video channels will be launched as follows: CNN, Discovery, Hallmark, Juice (music video), Prime (see below), Sky Movies (no longer called HBO), Sky One (no longer Orange), Sky Sport, Sky Sport II, and Trackside (satellite version), Sky is not saying but it appears there will be a short interim period when only 5 of these (Sky Movies, Sport, CNN, Trackside, Discovery, Sky One) will be available (in 3L) while analogue TAB/Trackside installations now using 3U will be replaced with digital equipment. The technical decision to limit video channels per transponder to 10 "at this time" is of interest given the recent expansion of Austar + Foxtel + Optus to 12 programme channels per transponder (see p. 18, here). Transponder 3 (L and U) will be an intermediate level of operation to allow what Sky claims are 20,000 existing Videocrypt analogue home and commercial systems to be converted over to digital. When this is completed (Sky says November - that seems optimistic), analogue services on 5L and 5U will be turned off and an additional 10 digital services will replace them. Sky says these will include Animal Planet, Cartoon Network, CNBC, ESPN, Fox Kids, (Granada) UK·TV, National Geographic, TNT movies and "two additional channels [another music - channel [V] likely - and another news channel - Sky [Australia] likely." Pointedly missing at this point - an EPG channel and terrestrial FTA services TV1, 2 plus 3 and 4. Of interest, "Prime" is a new (August) FTA terrestrial TV channel which is being treated by Sky as a pay-TV channel within their bouquet.



Analyser display of present Sky NZ interim service; left to right, NDS MPEG-2 (not DVB compliant), TAB/Trackside FTA analogue (which together are 3L and 3U), then Sky Sport and Sky 1 Videocrypt analogue (forming 5L and 5U); also see SF August #48, p. 30.

signals. New parameters for spectrum analyser look: LHC, 12.250-12.750.

Sky (Australia) Racing channel launched September 5 on Austar-Foxtel bouquet Optus 3; programme channel 15. TVSN, sharing with Australia TV on Palapa C2 (3880/1270Hz), is now gone (Australia TV 24 hour). Optus Vision test card, which replaced TVSN on PAS-2 (3743/1407Vt) is also now shut down.

Pacific Forum meeting late in August raised issue of announced Sea Launch Limited Partnership plan to launch geostationary and LEO satellites from floating launch platforms to be anchored within "Exclusive Economic Zone" or Kiribati. Forum asking for new safety study and guarantees Kiribati will not be adversely impacted environmentally by plan to launch 116 satellites over twenty years. First test launches scheduled late this year, then six per year. Representatives from Solomon Islands told participants, "*the nature of the rockets to be launched is indeed very suspicious.*" There will be 'debris' from launches; stage one weighing 36 tonnes, stage 2 at 11.5 tonnes and two tones of additional metal will fall back into the ocean during launch sequence.

Our report of new Indovision FTA package on Palapa C2 (3820Vt) is now superseded by reports (Colquhoun, others) the package appears now to be on 3762/1288Hz with Msym 12.857 and 3/4. Content matters not, mostly it is CA (including CNNI) although strangely ITJ Tokyo feeds have been seen (FTA). This may be totally different than previously reported 3820 service as none of the numbers fit and MTV that used to be in the first group is missing from this one. Happy searching.

Observer **Stu McLeod** (NZ) reports locating new (late August) terrestrial network Prime TV start utilising 1180

Questions, Myths and Dialogue on Internet Regarding the Aurora Platform

There is a growing awareness that ABC and SBS, to be available only through the Aurora platform when the B-MAC conversion is completed, are turning out to be quite expensive service channels. Those affected have discovered an "awareness group" at http://www.dejanews.com/=zzz-maf and associated sites. The dialogue shows confusion and concern about how the Aurora project is developing. Exchanges monitored follow.

(*Concerned citizen*) "I asked ABC and SBS if they would consider talking to AUSTAR about being part of their line-up, rather than encrypting their signal and moving to Aurora. The UEC 642 receiver SBS refers to in their reply costs about $1,000 + tax to purchase."

(*Mark Thackray, Public Relations via comments@sbs.com.au*) "SBS will be converting its two analogue (B-MAC) services to digital starting in December this year. There will be a simulcasting period between digital and analogue of two months. The digital service, on the Optus B3 Aurora platform, will be encrypted as an essential management feature required by SBS. All other Aurora services will be encrypted including the five ABC services. At this time the only Optus certified domestic decoder is the UEC 642 which must be purchased from Nationwide Antenna Systems or one of their dealers. Although SBS would like to have its services available through Austar, no such arrangement is under consideration at this time because of the costs involved."

(*David Rawsthorne*) "Why it should be more expensive is beyond me. Surely it would be better to transmit the ABC and SBS as a part of the Austar package, thereby sharing the cost of the B3 transponder? Could it be that Austar wanted to make some extra bucks out of it?"

(*petert@netc.net.au*) "The ABC and SBS contracts with Optus who own the Aurora Platform is the cost problem, according to ABC. Apparently those in a position to influence this have not considered the extra costs to viewers in the bush. You are going to have to purchase a duplicate satellite system, or at least another receiver, to get the ABC and SBS services. You could email SBS and the ABC with your displeasure. I have already done so."

SCPC format at 4024/1126LHC. Service numbers are Msym 6.870 and FEC 2/3. Prime TV is utilising satellite link to interconnect Auckland headquarters station to 8 remote transmitter sites throughout NZ. Station's Auckland programming forms majority of airtime for remote sites although some in major centres insert local commercials and news in place of satellite feed. Service is PowerVu format, and conditional access which is unique for a free to air television network anxious for as many viewers as possible. Linking is being supplied by NZ's BCL, a division of Television New Zealand, through their Auckland uplink site. Prime TV will be part of Sky Television pay package as well.

I701, 180E; try 3845/1305RHC (west hemi) for occasional feeds in FTA analogue.

AT Sign-Off

Pricing

Competition is a wondrous invention. When it works properly, prices tumble down and product quality + features rapidly improve. Competition challenges participants to find new ways to deliver something better at a lower cost. Nothing in the marketplace trims exorbitant profits like competition.

Rupert Murdoch once observed, "*A monopoly is a terrible thing .... until you own one.*" No modern day entrepreneur has done more to bust monopolies than Murdoch. It is a paradox that nobody has profited more from monopolies than he, either. The illusion of creating competition, being competitive, but under it all really being dedicated to the engineering of modern technology monopolies is what marks the man more than any other in history as singly dangerous.

If information leaks about the Optus Vision plan for DTH are accurate (and we will *only* know this *when* it happens), Optus - the corporation - is as much a paradox as Murdoch. Optus for Aurora began last January insisting there would be "competition" in the marketplace for Aurora IRDs. They continue this corporate line today but as readers fully appreciate, *saying* there is competition and then structuring the replacement IRD market with RTIF vouchers only available for purchase of a single model IRD (the UEC 642) hardly results in consumer product choice. Now we understand Optus plans a DTH policy with no IRDs! What a change in corporate position. For Aurora, only the UEC 642. For Optus DTH, we are being *told* consumers can use *any* IRD that will support Irdeto (that would seem to include even the original Panasonic 520s and DGT-400s; imagine the 520s suddenly becoming useful and valuable again!).

At the "bring-it-into-Australia" level, Irdeto capable IRDs hover in the region of US$320 (before shipping, taxes, duty) although we believe Austar's recent purchase of approximately 30,000 Sun Moon Star units was for a price 30% lower than this benchmark. IRDs are always priced at US dollars these days because of the wild fluctuations (and steady downward spiral) of the Australian dollar against world currencies. If US$320 ends up being Australian $550 on any given day, then A$795 puts $245 "profit" into the hands of *someone*. And that works out to 44.5% "mark-up on cost."

Consider now where we are headed. If Austar really *did* purchase 30,000 or so IRDs for significantly under US$320 each, that establishes a new benchmark price for IRDs imported for Optus (and ultimately Foxtel) DTH. And if IRDs are going to become competitive in the marketplace, with two or more brands and models on offer through a range of retail sources, a monopoly that has existed for far too long is broken.

Internet advertising is becoming a powerful tool. The operator of a Web Site can respond to changes in the marketplace in minutes. There is no waiting for the next monthly issue of a magazine, the next day's newspaper. There are teething problems, of course. Only a very small percentage

Panasonic at $795 with smart card and UEC 642 at $865 (RTIF $750 voucher + $115). Will the UEC remain competitive outside of the RTIF world?

of consumers have Internet access, less than 1% know how to use it to search out subjects by topic matter, and therefore many Web Sites are read only by enthusiasts and insiders who have mastered the special Internet skills.

Which explains why we republish the two competing advertisements above. What they tell us is while *most* people are paying A$995 for a UEC 642, *some* people are getting them for A$865 (plus, perhaps, $50 for the Aurora one-time smart card purchase). And, that you have a choice - *there is* a source (in Australia) for the Panasonic TU-DS10 IRD and surprise - surprise. It costs A$795 *including* the smart card.

Competition. It is full of surprises and very challenging. Why, it would not surprise us to see Optus discounting their one-time smart card purchase price through DTH dealers if the dealers purchase in quantity, and subsequently dealers "throwing in" the "$50 smart card" when the consumer purchases a DTH system.

Australia is at last moving into the modern world. Competitive choices in pay-TV programming, competitive offers in reception hardware is but the start. Alas. New Zealand will lag far behind if the preliminary announcements by Sky Television are to be believed. They will offer new digital subscribers a 60cm dish + IRD + installation for a subsidised price of NZ$495 (payable over 5 months) as long as the subscribers take as a minimum NZ$12.80 per week ($55 per month) in services. They will claim this is a special discount from a "normal" NZ$650 price. A monopoly is a monopoly is a monopoly. And challenging only to consumers.

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❑ **ENTER** my **36 MONTH** subscription to SatFACTS starting with October 15th issue (rates below)

NAME _____

Company (if applicable) _____

Mailing address _____

Town/city _____ _____ Country _____

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ALL SatFACTS SUBSCRIPTIONS ARE SENT VIA AIRMAIL - WORLD-WIDE!

USE THIS FORM ONLY WHEN CHARGING ON VISA/MASTERCARD

Please charge my **VISA/Mastercard** as follows:

☐ ONE Year of SatFACTS MONTHLY (NZ$60, A$90, US$60)

☐ THREE Years of SatFACTS MONTHLY (NZ$140, A$210, US$150)

☐ SATELLITE TELEVISION: The Booklet (NZ$10, A$12, US$10)

☐ One Year of COOP'S TECHNOLOGY DIGEST (NZ$125, A$125, US$125)

Indicate charge card type: ☐ VISA ☐ Mastercard

Name (as it appears on **VISA / Mastercard**) _____

VISA/Mastercard Number _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _

VISA/Mastercard expiration date _____

Instructions: If ordering by mail, return this complete (3-part) card or a copy of same (to **SatFACTS, PO Box 330, Mangonui, Far North, New Zealand**); if order by FAX, send full card as a single sheet to **64-9-406-1083**

SUPPLEMENTAL MATERIALS from SatFACTS MONTHLY: Order Form

☐ **SATELLITE TELEVISION:** The Booklet. Excellent introduction to home dish ownership for the layman, including major contributions from the father of geostationary satellites - famed science fiction writer *Arthur C. Clarke*. The perfect tool to help the satellite system seller explain home satellite TV to the layman consumer. From SPACE Pacific. NZ$10/ A$12 / US$10, airmail.

☐ **COOP's TECHNOLOGY DIGEST.** For the really serious enthusiast, investor, business person in satellite television and allied leading edge technologies. Ten issues each year, jam-packed with information you will not find anyplace else. "Coop" routinely culls more than 60 publications world-wide, terribly expensive newsletters, Internet and his hundreds of private contacts to keep you right at the leading edge of technology on the REAL changes underway in telecommunications. Conveniently issued near the **first of the month**, creating an excellent time-line-filler between the mid-month issues of SatFACTS. Now in the **6th year**, airmail world-wide. Normally NZ/A/US$250 per year - for SatFACTS subscribers special **50% discounted** price of NZ/A/US$125.

OBSERVER REPORTING FORM - Due October 5, 1998

• NEW programming sources seen since September 1st: _____

_____

• Changes (signal level, transponder, programming content) in pre-existing programming sources since September 1st: _____

_____

• OTHER (including changes in your receiving system): _____

_____

NOTE: Please use P1 - P5 code when describing signal levels and receiver IF/RF settings.

Your Name _____

Town/City _____ _____ _____

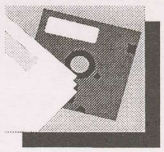
Make/size dish _____ LNB _____ Receiver _____

Your email address _____ if you have one!

MAIL TO: SatFACTS Monthly, PO Box 330, Mangonui, Far North, NZ or fax 64-9-406-1083

email - DO YOU HAVE email CAPABILITY?

AN EXCITING NEW SERVICE from SatFACTS is coming. And we'll give you just one clue: "It is NOT monthly!" If you have email capability, and would like faster updates - return this card!



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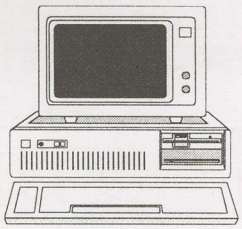

☑ YES - I AM on-line with email!

email address _____

My name _____

Mailing address _____

Town/city _____ _____ _____

Mail or FAX this form to SatFACTS-Q, PO Box 330, Mangonui, Far North, NZ or fax to 64-9-406-1083

SPACE INFO PACK?

Looking for the "inside track" to more sales and greater profits in satellite systems? The trade association SPACE Pacific may be able to help.

☑ YES - Send membership data including Mark Long/SPACE certification course detail

NAME _____

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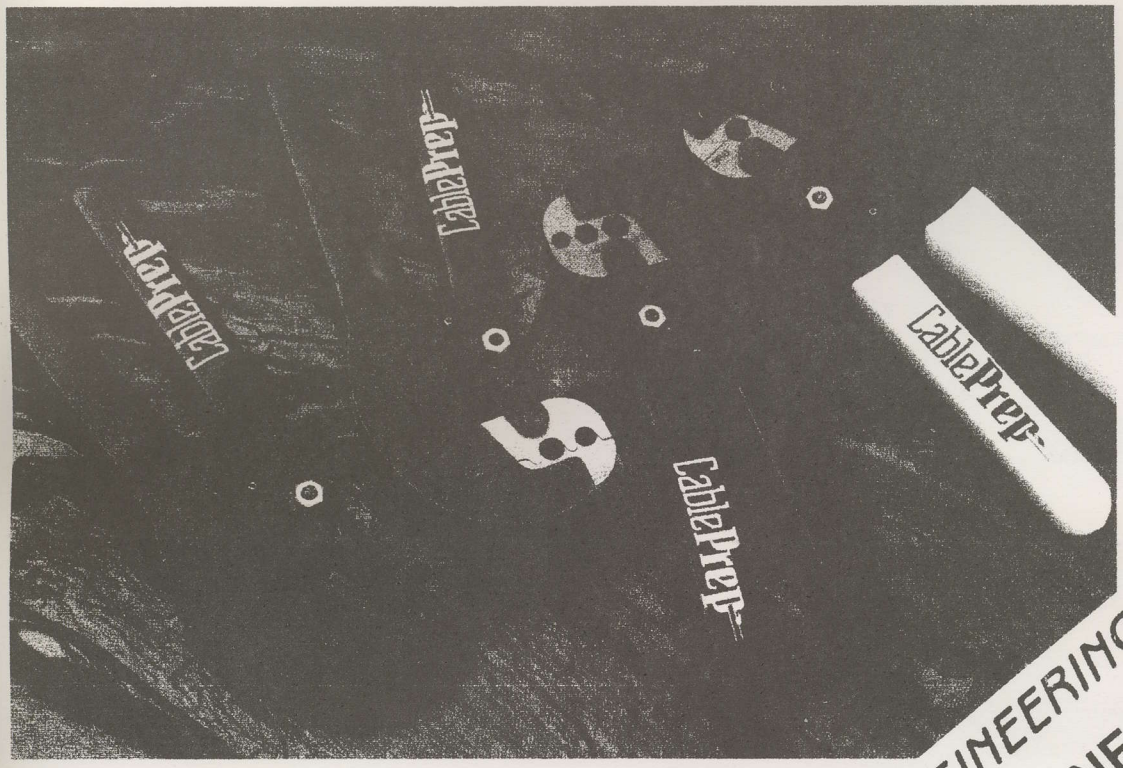

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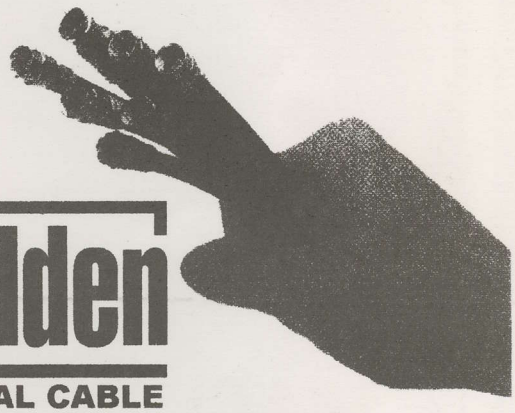

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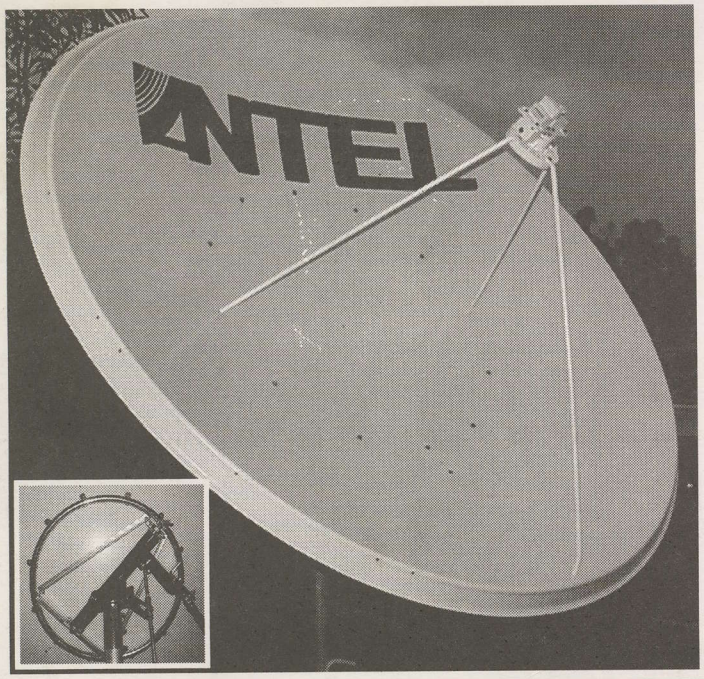
ANTEL

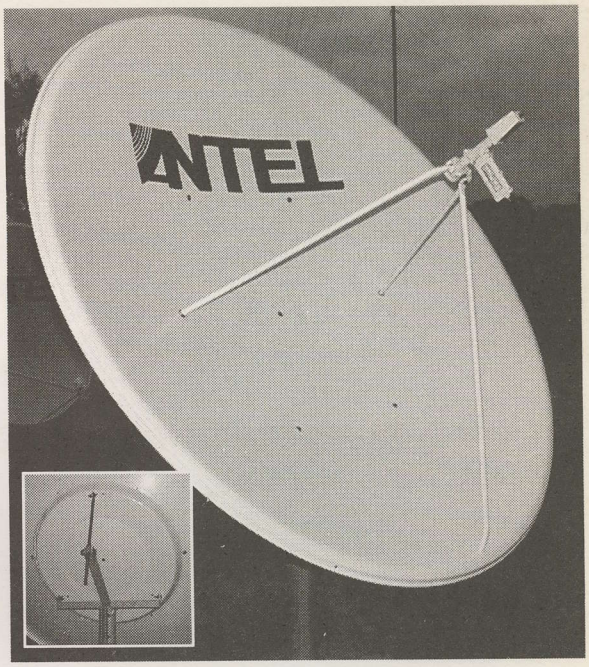
Precision Spun Aluminium Dishes

Antel 2.3

Single piece spun aluminium dish.

Total Diameter	**2.4m**
Reflector Diameter	**2.3m**
Pole size	**102mm**
F/D ratio:	**0.4**
Focal Distance	**930mm**
Gain: (>60% efficiency)	
4GHz	**37.7dBi**
12GHz	**47.2dBi**
Beamwidth 12GHz	**0.53°**
Maximum Wind Speed	
Operational	**120kph**
Survival	**160kph**
Finish:	
Dish	**Epoxy-Polyester Powder Coated**
Mount	**zinc plated**
Weight	
Polar mount	**44kg**
Reflector	**33kg**
Two mount options:	**Fixed & Polar**





Antel 1.8

Single piece spun aluminium dish

Total Diameter	**1.9m**
Reflector Diameter	**1.8m**
Pole size	**89mm**
F/D ratio:	**0.41**
Focal Distance	**740mm**
Gain: (>60% efficiency)	
12GHz	**45.5dBi**
Beamwidth 12GHz	**1°**
Maximum Wind Speed	
Operational	**140kph**
Finish:	
Dish	**Epoxy-Polyester Powder Coated**
Two mount options:	**Luxury Mount (fixed)** Spun aluminium ring, stainless steel elevation rod, fully galvanised pole cap. **Standard Mount (fixed)** Zinc plated ring, elevation rod and pole cap.

These quality products distributed by:

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