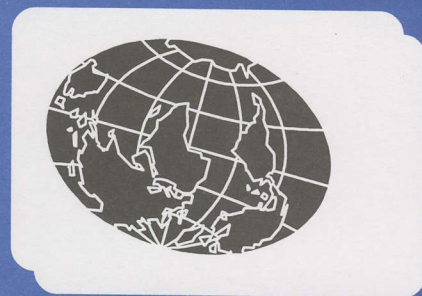


Bob Cooper's

JUNE 15 2002

SatFACTS

MONTHLY



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

IN THIS ISSUE

**Low Cost
SpecMon
for satellite**

**Feedback
on "state
of piracy"**

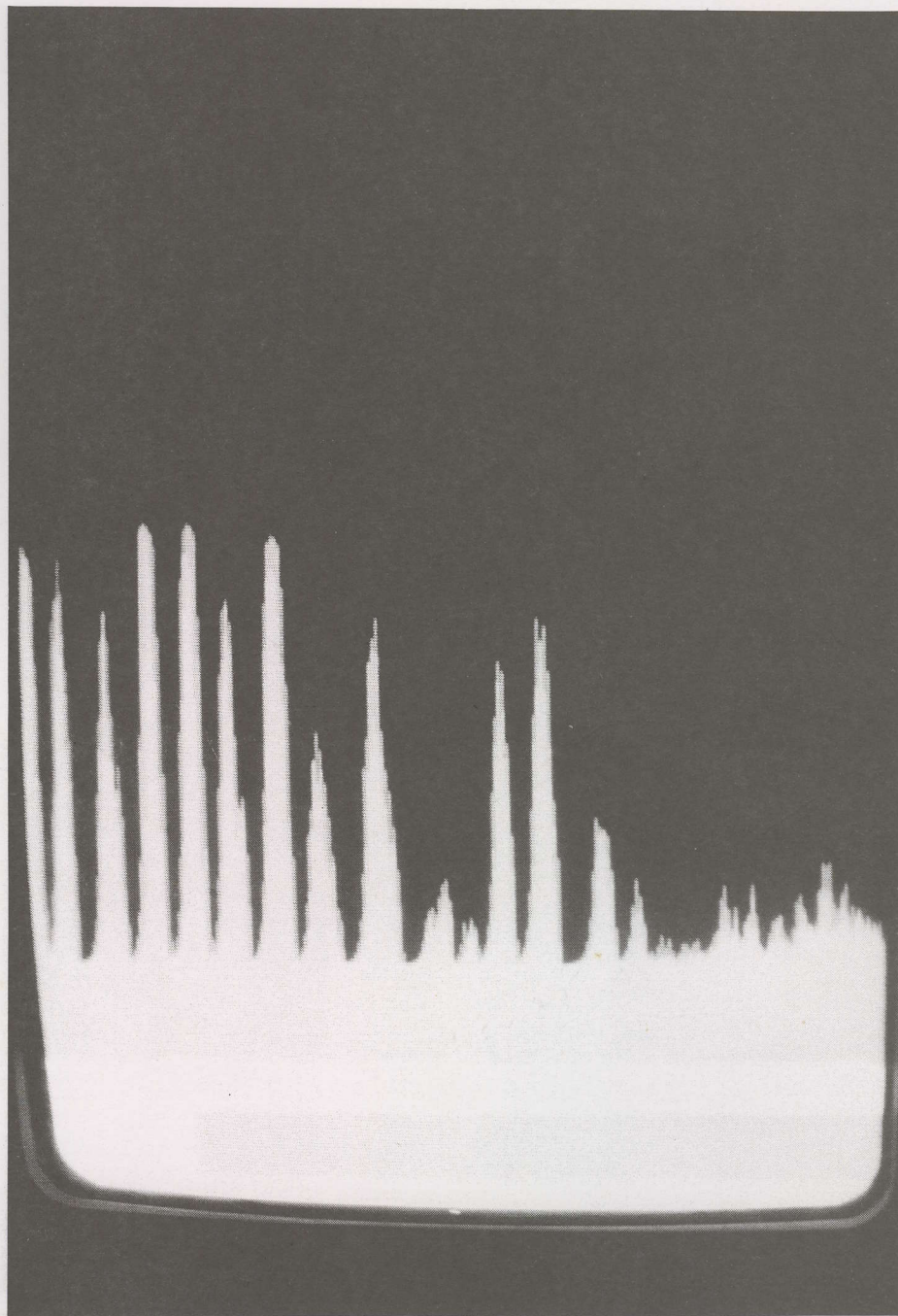
**Traps, filters to
process
terrestrial signals**

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- ✓ Latest Hardware News
- ✓ Cable TV Technology
- ✓ Observer Reports

Vol. 8 ♦ No. 94

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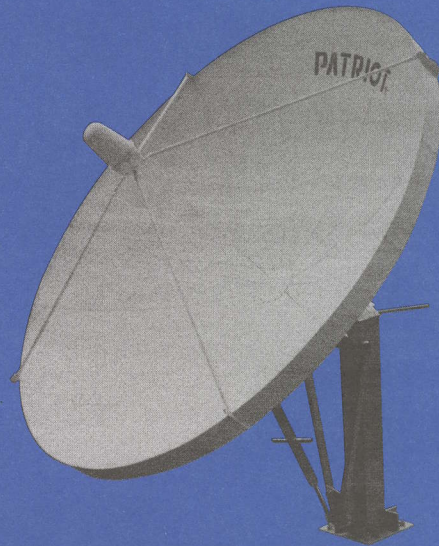


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This publication is dedicated to the premise that as we are entering the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages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

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

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COOP'S COMMENT

The era of the smart card is drawing to a close. Well, the smart card as we now know it. Already third generation devices are being Beta tested in pay-TV environments, perhaps near you. Unfortunately for their creators, existing receivers with embedded CAMs and those with insertable CAMs require major design changes to function with third generation encryption systems. The "bottom line" here is, should a programmer elect to upgrade to



June 15, 2002

third-gen, all existing receivers will require replacement. In an industry where cash flow is king and large new expenditures likely to be difficult to swallow (consider the drama at Austar if all existing IRDs had to be replaced), this creates a dilemma. Further, while security of the product is increasingly a paramount concern, programmers are now rightfully questioning whether third-gen will ultimately be impossible to hack (as the creators believe) or simply launch a new round of cat and mouse with the hacker world.

Third-gen encryption should not be confused with the current efforts to "patch" the weak spots in our present conditional access systems. SECA-2, Irdeto-2 are rolling out around the globe and are essentially SECA-1 and Irdeto-1 with a "firewall" added. Irdeto-2 and Irdeto-1 can be transmitted simultaneously in the same data stream which allows the programmer to phase-in new generation smart cards. As Irdeto-1 cards are replaced one for one with Irdeto-2 cards, and all new users past a certain date automatically receive -2 cards, eventually -1 can be shut down. This will leave the hacker cards which in theory will not be a part of the replacement cycle without service as the -1 portion of the data stream is turned off. Optus Aurora is conducting their own testing of this dual -1 plus -2 streaming currently and wholesale buyers of -1 format cards (distributors who typically purchase 100 or more at a time for resale as a part of a system) have been warned, "Don't buy as many -1 format cards at this time as you have been accustomed to do - *new cards are coming.*" Alas upgrading -1 to -2 is but a patch adding a firewall to the nano stream architecture and if web site exchanges monitored during early June are truthful reflections of the security of -2, changing out Aurora cards to -2 is not likely to buy the programmers much more than perhaps a six month hacker-catch-up window.

Piracy of pay-TV has become mainstream attracting the interest of journalists who six months ago would have found the topic uninteresting and "fringe." This has the unfortunate effect of making it "table talk" for millions of non-technical consumers world-wide. The pay-TV industry can thank Rupert Murdoch's alleged corporate indiscretion with Canal-Plus for turning what was once an insider, highly technical topic into common talk that attracts the interest of the typical consumer. And this has the further side effect of making investors suddenly leery and even sceptical when offered pay-TV public stock as an investment.

The pay-TV engine for nearly a decade has been driven by public enthusiasm for corporate stock ownership. Now that (satellite delivered) pay TV's basic technical weakness has become common knowledge, people are questioning the wisdom of holding shares in businesses totally dependent upon the "security" of a laminated piece of electronic circuitry. Recently Australian based News Corp announced the largest quarter year corporate loss in the history of Australia - something in the region of \$A7 billion (the exact number is, as always, so buried in Arthur Andersen accounting that perhaps even they do not know the "real" number). The stock, not unpredictably, lost value instantly. Big value. And this drew howls of protest from no less than Rupert Murdoch personally who waxed indignant that the public could be so short sighted as to take a 7-billion dollar loss as anything more than a temporary blip on the investment radar screen. Perhaps the public finally has Rupert's "number."

In Volume 8 ♦ Number 94

SpecMon - a low cost "see the satellite" display -p. 6

Piracy: Feedback and additions to our May 2002 report -p. 10

Traps and filters: Cleaning up terrestrial reception -p. 14

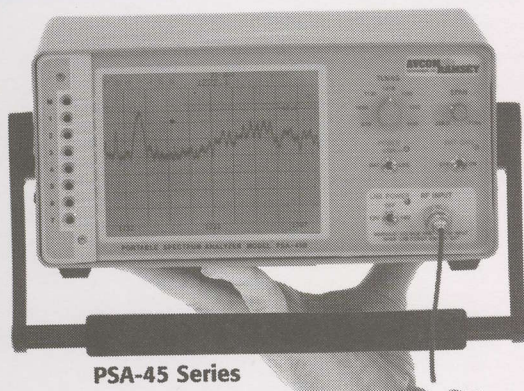
Departments

Programmer/Programming Update -p.2; Hardware/Equipment Update -p. 4; Teck Talk (Measuring splitters for performance) -p. 20; SatFACTS Digital Watch -p. 22; Supplemental Digital Data -p. 24; Vodkas is an essential ingredient -p. 26 With The Observers -p. 28; At Sign-Off: (Optus threatens to close down) -p. 31

-ON THE COVER-

Everyone would like a spectrum analyser. But they cost big bucks and require some operating skills. Perhaps - not any more! (p. 6)

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



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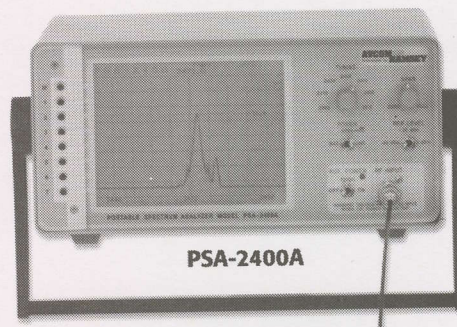
PSA-45A \$2,060.00

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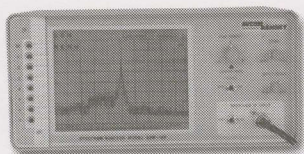
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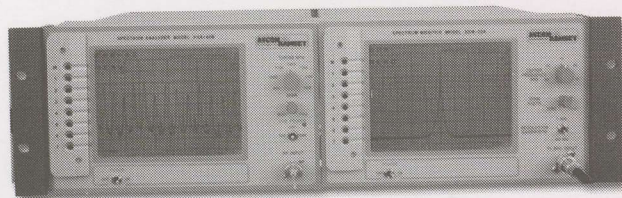
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PSA-2400A



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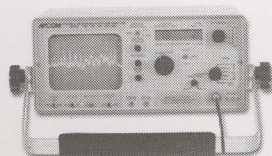
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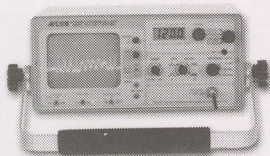
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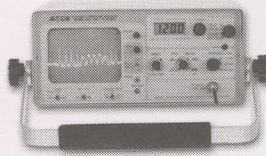
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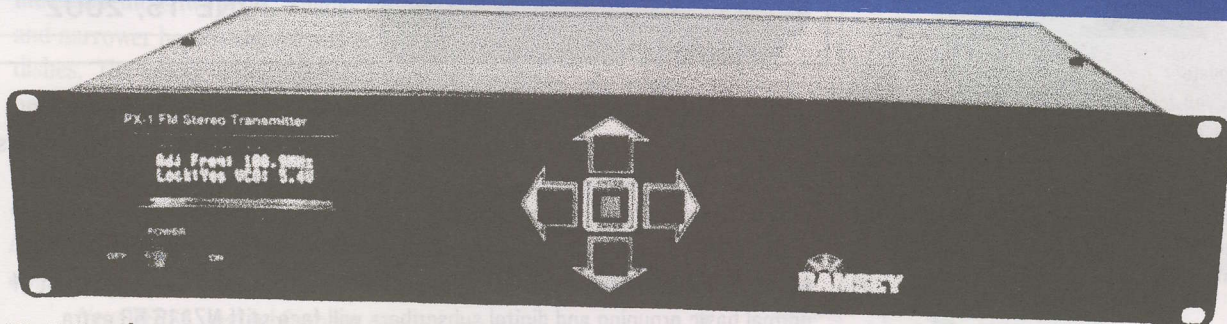
PTR-25D B&W \$1,395.00
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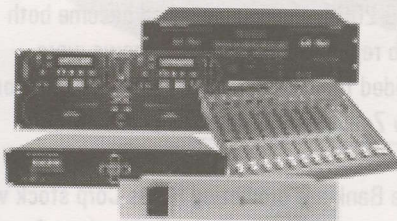
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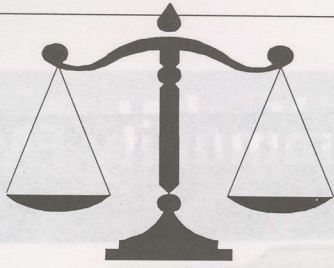
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Hacking update

"Thank you for your excellent article describing the status of hacking in the May SatFACTS - in particular, the detailed listing of web sites in this realm. I have to wonder whether the magazine was 'banned in the UK' since this sort of critical examination is usually considered unpublishable in that country - especially the web site listing."

AO, SE Asia

"Our normal supply of SatFACTS arrived on the day we opened at the London Show. The entire box was emptied within minutes of opening and two days later I spotted those fortunate enough to have been around when we opened the carton with their nose still stuck in their copies. They certainly made our show booth a popular spot!"

(Name withheld upon request, UK)

"I am going to have to do something about my copy of SatFACTS. I casually shared the May issue to a visitor and he immediately tried to talk me into letting him take it home overnight. I refused and so he sat there in a lounge chair reading for several hours until finished. The next day he sent five mates over and I ended up having to feed them all dinner - reluctant as I was to allow it out of my home."

AA, South Africa

"Let me see if I have this right. To avoid paying \$50 or so a month people actually spend hundreds, thousands of dollars to acquire card readers, writers, and, PCs with extra speed and memory? And then when their proud card creations break, they spend hours and hours searching the web looking for some knowledge that will allow them to glue the broken cards back together again? Insane. Utterly mad! Have these people never heard of reading a good book, taking a walk in the sunset or pouncing on their mate?"

Clyde P., NSW

"UBC Thailand has been using Irdeto-2 since January of this year; otherwise May's SF hit the nail on the head."

ML, Bangkok

WIN-TV

"I always believed that WIN-TV was exclusively an affiliate of the Australian Nine Network. I was wrong. They have been carrying Ten Net programming as well (Big Brother, Everybody Loves Raymond for example). I have tried to use my UEC 642 on WIN's Aurora channel 24 with bad results - the 642 produces subtitling all right but it has that unexplained over writing problem where after the first line all the following pile on top making it impossible to use. Optus' insistence that IRDs be text capable was obviously a ruse to cover up some private deal between them and Optus. Perhaps some day the 'truth' will be revealed. In the meantime, those of us who bought Aurora's package are paying the price."

Surprised and angry, WA

**PROGRAMMER
PROGRAMMING
PROMOTION****UPDATE****JUNE 15, 2002**

Irdeto-2 is being simulcast along with Irdeto-1 within Optus Aurora bouquet; distributors have been warned to "not over stock" on current version Aurora cards as new I-2s are coming "soon."

Sky NZ terrestrial analogue and satellite digital rates going up 1 July - typically NZ\$5 or 20% in case of terrestrial package. Primarily affected are packages including sport channels although movies have now been juggled out of normal basic grouping and digital subscribers will face stiff NZ\$16.63 extra (monthly) fee to get movies back. Sky NZ has been on track to be one of (if not *the*) first to break viscous satellite TV money losing cycle which begins with services providing gratis \$500 hardware packages to viewers.

Fashion TV (FTV) has moved with a new address (10/12 Rue Hamelin 75016 Paris France), telephone (+ +33 1 45 05 45 46) and fax (+ +33 1 45 05 45 44). They continue encrypted (Irdeto 2) on AsiaSat 2.

WorldNet's As2 service is now digital (3880Hz, Sr 20.400, FEC 1/2). Schedule is found at www.ibb.gov/worldnet. Those who use feeds from WorldNet should check web pages for latest updates - in particular, "Program Alert" which is updated no less often than 0700UTC daily.

"**The Gatekeepers**" is a Mark Westfield paperback book first published in 2000. For those who have an interest in the political and business shortcuts taken by Australia's pay television industry, the infighting with broadcasters and publishers, this is a must-read. Av-Comm's Garry Cratt liked the book so much he contacted the publisher and made arrangements to offer it to his customers at a discount - A\$30. We haven't read it yet but will and report to you next month! Av-Comm as cgarry@avcomm.com.au.

The SPACE Pacific Sunday twice-shown TV show transmitted for nearly 30 months by Mediasat on Optus B3 has closed down. There were 15 programmes, 1 hour in length, produced in the period 1999-2000 which frankly had become both dated and were essentially being shown to repeat audiences. The shows were sponsored by industry suppliers who provided funds for production in exchange for advertising messages, and created in New Zealand by SatFACTS publisher Bob Cooper.

Stock analysts at Germany's Deutsche Bank are predicting News Corp stock will hang in the region of US\$13-\$14 "over the next year" because of a number of negative influences. Included in their list - the Canal Plus court action. Supporting that, Lehman Brothers spokesman Peter McNally, software specialist in London, told the business press, "*The (Canal Plus) lawsuit has been killing NDS (and News Corp) stock and it has fallen to a ridiculously low valuation.*" If you believe Murdoch's guys will beat the Canal Plus suit and recover, this could be a good time to invest in NDS stock at its current depressed value (low of \$8.50, currently around \$10.50).

ZEE TV Aust/NZ considering close down end of July - losing money.

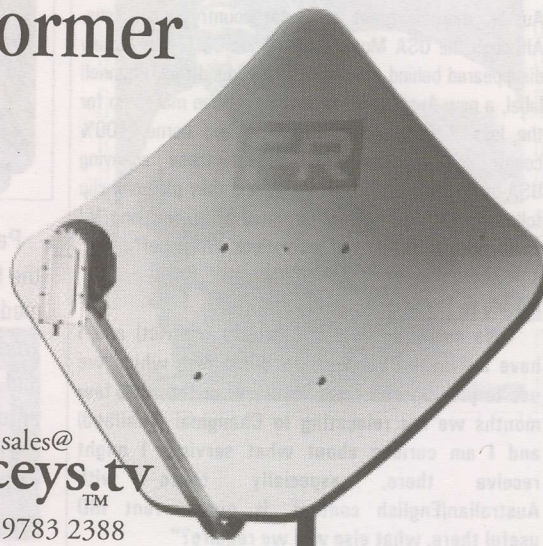
Run it up the flag pole. Australian Government officials are floating a number of very tentative proposals in the hopes one will jump start the faltering uptake in terrestrial TV receiving systems. One of these would allow 7, 9 and 10 networks to begin transmitting a second and even third programme channel using the digital capability, in the belief that people will buy digital TV systems if offered more channels. To date, digital's "higher quality" has been a non-incentive as has been the 16:9 wide screen format. In fact, viewers world wide have had similar reactions to "better quality" reception - all they really want are "more channels."

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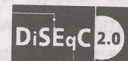
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Country Music Fans

"If you live within Australia and are able to access Austar, there is great news for country music fans. Although the USA Music Country/nee CMT has largely disappeared behind their new STC (Soundtrack Channel) label, a new Austar-only service more than makes up for the loss. CMC is Australian bred and borne, 100% country, in glorious PAL without those annoying USA-bred NTSC to PAL artefacts and they play one clip following another - not interrupted with annoying VJ small talk and endless self promotions. Welcome!"

CP, NSW

Moving to Thailand

"We currently live in Canberra (district) and I have a Prosat DV3 decoder, 90cm dish which we use to pick up TV5 from Thailand. In the next few months we are relocating to Changmai (Thailand) and I am curious about what services I might receive there, especially those with Australian/English content. Is our current IRD useful there, what else will we require?"

Paul V.

"SatFACTS: Reference your Email query. If Paul wants to subscribe to UBC, the Thai pay-TV service, it requires an Irdeco-2 capable receiver. But as for receiving Australian/English content, his 90cm dish will be woefully inadequate. CNBC, Bloomberg, Fox News, EWTN, TBN, and from his home country ABC A-P are all on C-band and a minimum would be an 8 foot dish (easily acquired locally in Changmai) and a ten foot locally build mesh job would be a better choice. Cheers. Siam Global, Thailand."

WIN's Pixels

"A letter appearing in a local newspaper takes local WIN-TV to task for 'broadcasting static during the Friday Night Footy' telecasts. I checked and sure enough, what the terrestrial viewer sees as static is what we would call 'pixelation' - the image freezes for up to several seconds time. This particular programme is a feed taken from the Nine Network and obviously someplace along the way the carrier to noise is marginal resulting in a receiver locking up and pixels appearing. The letter writer like most consumers only sees it as 'static' of course - something that interferes with his enjoyment of a telecast. If the networks cannot get digital linking correct, what hope should we have that consumer reception of digital terrestrial is going to be anything other than a nightmare for those viewers located in what now amounts to fringe areas for analogue? I am not optimistic about where this is headed."

AI, NSW

Satellite receiver compliance

"All satellite receivers sold in New Zealand must meet the requirements of the Electromagnetic Compatibility Compliance Notice 2001. The applicable standards are CISPR 13, EN55013 or AS/NZS1053 which can be read at www.med.govt.nz/rsm/standards. Satellite receivers employ oscillators and/or mixers which could potentially create interference for other non-associated users. Satellite receivers used for data, video conferencing and IT have similar but different technical requirements."

John Ru Bay, District Manager, Palmerston North
Radio Spectrum Management

HARDWARE EQUIPMENT PARTS

UPDATE

JUNE 15, 2002

Patriot Antenna Systems has acquired the tooling and manufacturing rights for the 6.1m Vertex RSI professional grade dish. This antenna has been an 'icon' of medium sized dishes, widely used for professional down and uplinks throughout the world. Patriot in the past year has also acquired rights to the Paracclipse consumer and semi-professional line of antennas as well as the ADL line of C and Ku band antenna feeds.

Philips sells to Fracarro Group. Royal Philips Electronics has sold their MATV/SMATV equipment product line to Italian firm Fracarro which effectively gives the new owner 22% market share in the European wide SMATV business. Fracarro will continue to market under both its own branding and that of Philips until December 2004.

Russia's LMI AP1 and AP2 (130E, 142.5E at last verified report). Both are still there, but with +/-9 degree inclinations which makes them useless for much of anything other than practising with a yo-yo. Express 6A (80E) has a north-only beam, although the hottest transponder is a whopping 46 dBw (60cm C-BAND dish!) and might be snared with a big antenna even in NSW. Sources of accurate Russian information remains Stefan Kollar, Sales Director for Intersputnik with Email of stkollar@intersputnik.com.

Peter Lacey Antennas, an installation firm handling TV antennas and distribution systems in Victoria, has been sold to Antenna Systems Pty. Ltd. Details from David Pester at (03) 9783 8966.

New Zealand's unlicensed, low power FM Broadcasting (LPFM) service which has previously been allowed to operate between 88.1 - 88.5 and 100.2 - 100.8 is being moved by Government decision to allow expansion of commercial and public high power FM broadcasting into the spectrum between 100 and 106.5 MHz. The unlicensed (type approved) 300 milliwatt transmitters will now be allowed to operate at 88.1, 88.2, 88.3, 88.4 at the bottom of the FM band as well as 106.7, 106.8, 106.9, 107.0, 107.1, 107.2 and 107.3 MHz. The changeover date must be prior to June 30.

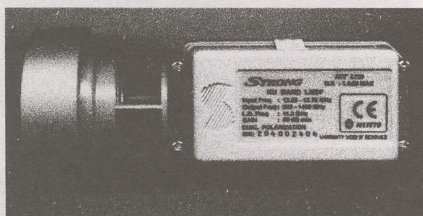
Patchy reception. When UK's iTV Digital closed down, the transmitters stayed on the air a few extra days to allow hurry-up testing to measure whether by reducing the number of programming channels per multiplex (MUX) homes that have not been able to receive the signals might suddenly be able to do so. The tests were inconclusive. One London based aerial firm charges BP41 (A\$105) to come to your house and make a test to determine if you are capable of having terrestrial digital service. They then charge (up to) BP171 for a new antenna installation - A\$435 (that is just for an aerial, installed friends - the TV set is extra!). The new Pace DTT set-top decoder, by the way, costs A\$255 in the UK which means the aerial, installed, is nearly twice the cost of the decoder. Is there a message here about DTT coverage, problems, and the cost of providing solutions? We think so.

More patchy reception. Two affluent Sydney suburbs, Kings Cross and North Head, remain without adequate terrestrial digital reception because digital repeaters (to parallel existing analogue repeaters) have not been installed. An estimated 70,000 homes are affected and the repeater sites may not be fully operational before December 2003.

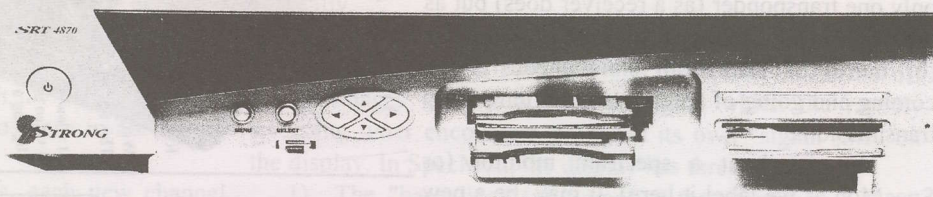
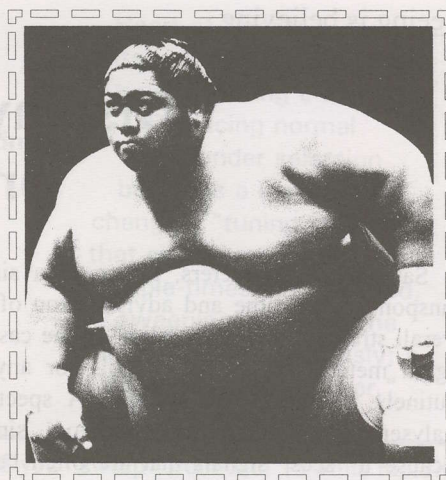
Sky NZ's latest activity. 12.707 and 12.734Vt are now being uploaded from Wellington at Avalon's TVNZ facility. NGS and Discovery originate there, go direct into Sky MUX to save Sky Auckland bucks for new NDS encoders. *Don't ask.*

STRONG KU BAND

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LNBF S
RECEIVERS



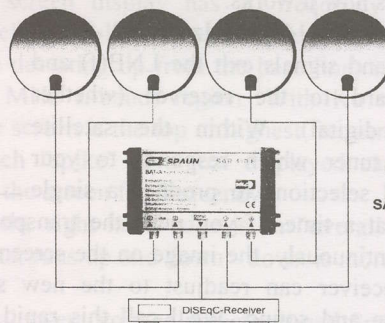
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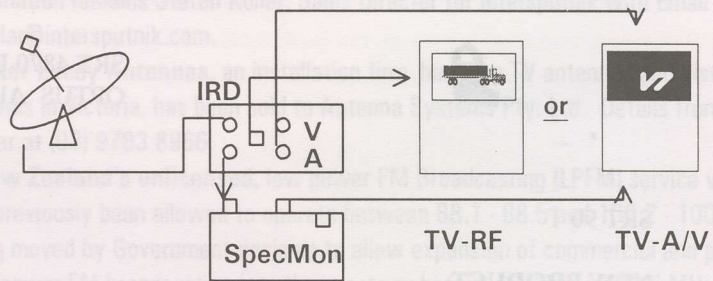
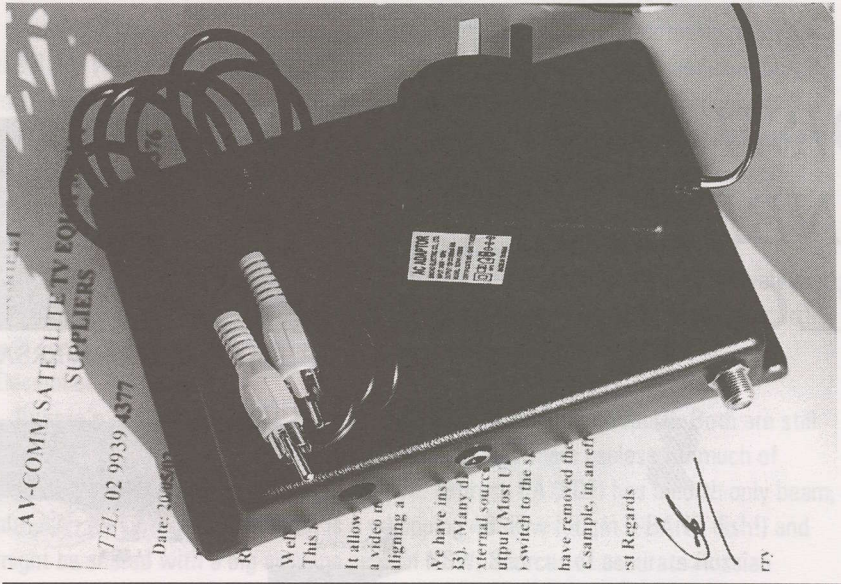
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Displaying the entire satellite on your telly screen

Satellite signal meters, tuning in a single transponder at a time and advising you of the overall strength (and/or "quality" in the case of digital meters) are essential tools for anyone routinely installing dish systems. A spectrum analyser (spec an) is a better tool simply because it "sees" signals that are often below the threshold of simple meters, and, you don't have to be tuned to a specific transponder because they "see" the entire satellite downlink region - all of the transponders, simultaneously (for a single polarisation). Spec an devices also allow you to "monitor" (keep an eye on) not only one transponder (as a receiver does) but as they can be adjusted to display a full 500 MHz (or more) of bandwidth simultaneously, the coming and going of feeds and other temporary transmissions.

This is about a spectrum monitor (or SpecMon as we label it here). It may be a new term to some, and it would be a mistake to consider it a low-cost spectrum analyser. The SpecMon gives you a new pair of eyes - well, one eye. Here is how it works.

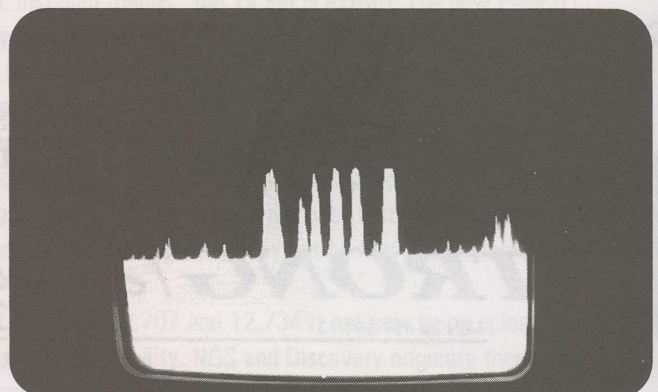
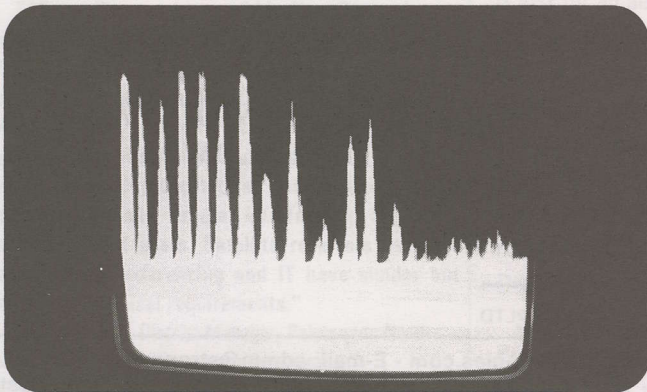
The L-band (950 - 1450 MHz or 950 - 2150 MHz) broad band signals exit the LNB(f) and travel downward to the receiver (whether analogue or digital). Within the satellite receiver is a tuner which responds to your remote control selections to produce a single signal/service at a time. If you push the transponder button rapidly and continuously, the image on the screen changes as fast as the receiver can readjust to the new settings and produce picture and sound. We'll call this rapid changing a "sweep rate" (as in, your finger pushes the button and the receiver "sweeps" from channel to channel). Now, because the receiver has to readjust to the parameters of the new channel

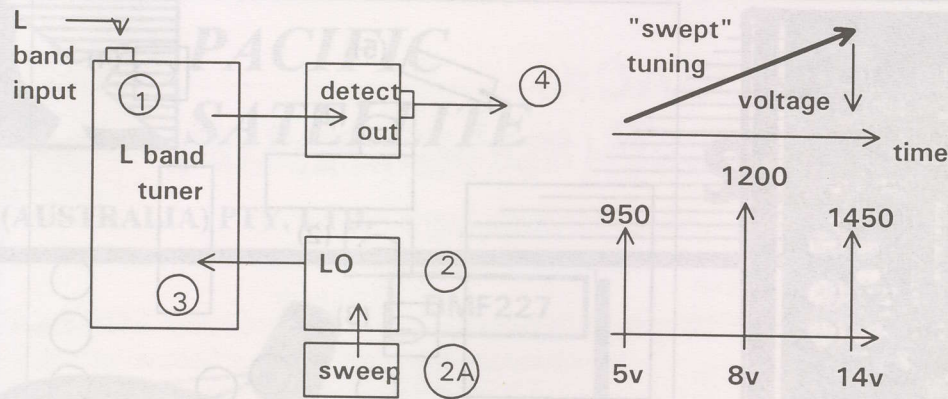


chosen, there is a time delay between pushing the button and seeing new images on the screen. One or two seconds "delay" is not unusual.

This delay is an inherent limitation in the receiver to address and process the new video (+ audio) data stream. Suppose you told the receiver *not to bother* processing the new video + audio - simply change channels fast absent processing?

THE display(s). Signals encountered by "sweeping LO" are converted into solid white lines on TV set's picture tube; each line is a transponder or SCPC signal and each satellite has a "unique" signature.
NOTE: All (4) images shown have been "turned" on their side for publication; left is "down", right is "up."





Heart of SpecMon is a voltage tuned (varactor) RF tuner covering L-band. Replacing normal transponder selection button is a constantly changing "tuning voltage" that changes transponders multiple-times each second, "sweeping" through the tuning range repetitiously; a super-fast "scan tuner."

Now suppose rather than processing the video + audio, the receiver simply created a "signal strength" line (voltage) which approximated only one element of the channel being received - the strength. And you connected that voltage through an appropriate processing network to a display screen - say a television set?

SpecMon from Av-Comm Pty Ltd. is such a device. With some embellishments. First, it recognises that if they gave you a remote control to operate it, and told you to "press the channel change button very rapidly" that you could not possibly press it fast enough to go through say 24 transponders in a second. Or two or perhaps five. So there is no remote control with a "press here - fast" button.

When you manually change channels, each new channel entered causes a tuning voltage to be applied to the satellite receiver's L-band tuner. The voltage for transponder 1 is different than the voltage for transponder 24. Every transponder, or in the case of a digital IRD, each digital carrier frequency has its own built-in "memory voltage" for channel selection. Nominally the range of tuner-tuning voltages might fall between 5 and 15 volts. Tuners use a system called varactor tuning; each specific voltage causes the tuner to go to a new frequency.

A suitable L-band tuner can be modified as follows:

- 1) Replace the manually entered transponder selection / voltage tuning with a (sawtooth) "ramp voltage." The rate of voltage change, which "sweeps" from 5 to 15 volts in our example, can be set as well.
- 2) Replace the normal video demod function with a circuit that measures the actual signal strength (level) for each signal the rapidly tuned tuner encounters, and then use that new "detected signal level" to create a simple voltage that corresponds to the signal level.

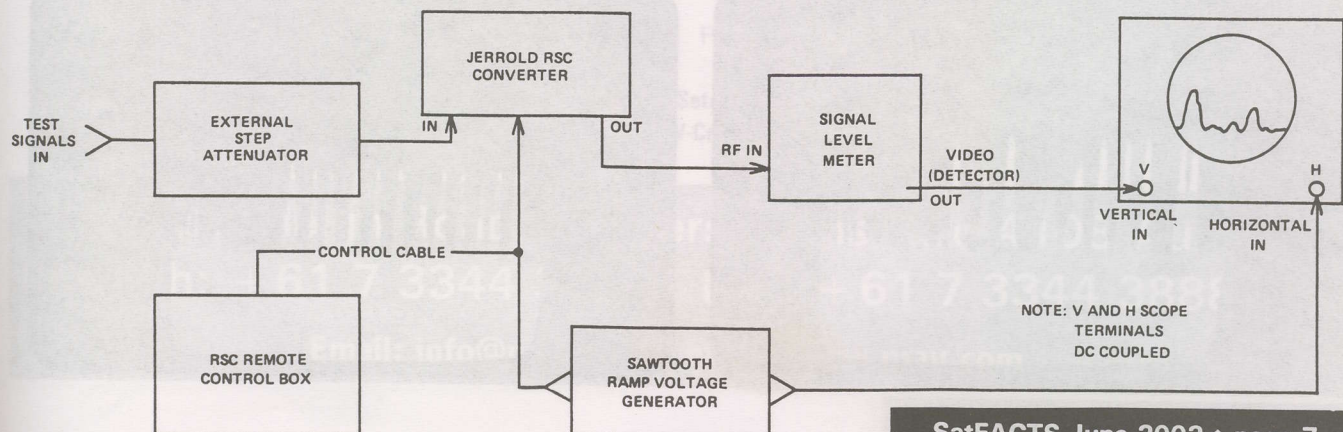
In the first step, if you "sweep" from 5 to 15 volts rapidly (say 10 or more times each second), restarting at 5 volts each time the "ramping voltage" reaches 15, the rapid finger movement on the mythical but non-existent remote control is eliminated. Plus, as you could never push all 24 buttons 10 times a second anyhow, the tuner is "swept" through the frequency range far more efficiently than you could do manually.

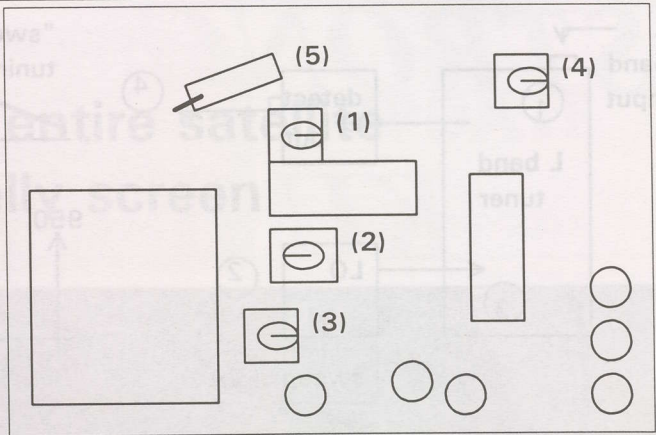
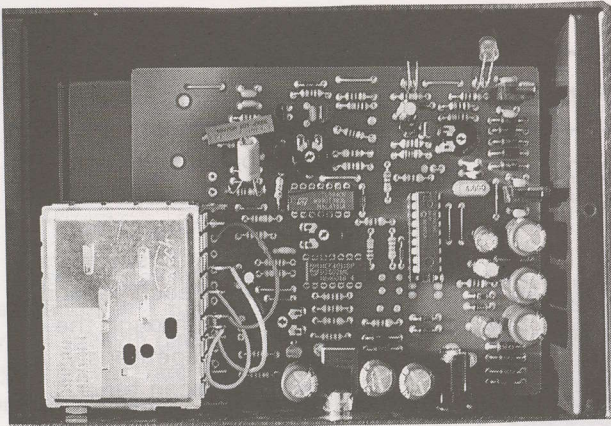
The "signal level voltage" can be made to create a pattern which is viewed on a normal TV screen (CRT). As the off screen images here display, each signal which the rapidly sweeping tuner encounters produces its own "signal line" on the display. In SpecMon, the display has three elements.

- 1) The "base line" (no signal at that particular L-band frequency) is vertical, near (but not quite at) the right hand edge of the display. The stronger a particular signal, the more it deviates left (which corresponds to upward in signal level).
- 2) The screen display has a "frequency-of-reception" element as well. On C-band satellites, the bottom of the screen (the first line deviating up from the base line) is in the 3,700 MHz (1450 MHz L-band) region. With Ku reception, the bottom of the screen is the top or highest frequency displayed. Therefore each "spike" of signal displayed can be roughly calibrated on the screen for frequency.
- 3) Along the right hand edge is an "overall signal level" (wider) bar that runs up and down - down is more signal, up is less signal.

The original swept voltage varactor tuned SpecMon device originated in 1976 using a cable television (analogue) set-top box. It gave cable techs the tool required to simultaneously see all of their cable spectrum on a display screen without the expense of a fully-qualified spectrum analyser. Their version required an oscilloscope for display; SpecMon does not.

THE original. Community Antenna Television Association (CATA) and CATJ magazine packaged parts kits allowing several hundred people to build the "Laufer Analyser" - from September 1976 CATJ magazine.





SPECMON internal. Adjustments are as follows: (1) location of baseline - left / right; (2) signal level sensitivity bar, up and down; (3) do NOT touch - does not effect display parameters; (4) varies the display frequency window, above and below 950 - 1450; (5 - trim pot) signal display line length - makes all signals either shorter or longer (right to left) on display.

To re-emphasise the obvious: SpecMon is not a test instrument, not a spectrum analyser. Yes, it does turn individual signals into a line on a display screen. No, you cannot in the sense of a purpose designed spectrum analyser accurately determine the (1) frequency, (2) modulation format, or (3) signal level (other than roughly) with SpecMon. So what good is it?

Hook it up and "see"

There are three connections to make. First, a 12V AC power pack. Second, a RCA socket output which connects from the SpecMon to the video input on any TV set. Finally, an L-band F connection from your existing satellite installation.

If you have a digital IRD with an input (from LNB[f]) and a throughput second F connection socket, simply allow the LNB(f) to go through the IRD and then with a short jumper to the input on the SpecMon. TV set display. Any TV with alternate selection of A/V (from an external A/V source such as a tape player) has the input you need. What comes out of the SpecMon is video (not RF!) and you can switch from normal TV reception (whether satellite or terrestrial) to the appropriate (A)/V input on the TV and "see" the display. Alternately, you may wish to use A/V input on a system VCR for the same purpose.

Once hooked up, and power applied, the SpecMon instantly displays on the screen the same sort of displays you see illustrated here. Now it does this in glorious living black and

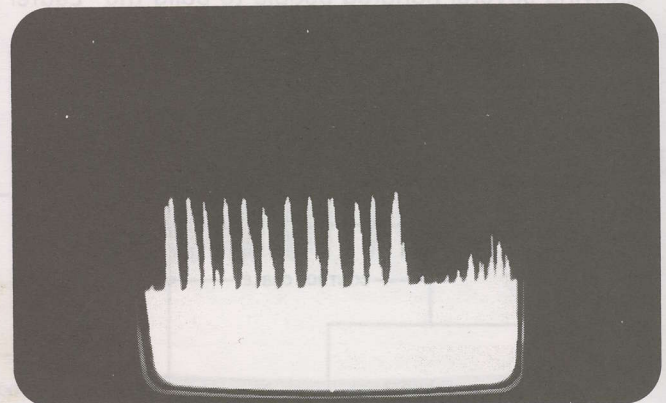
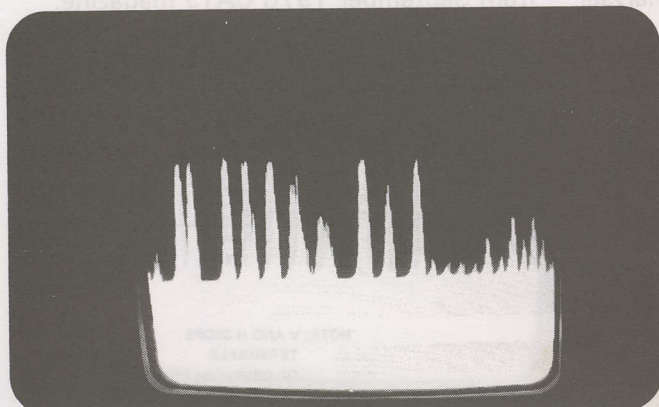
white (not colour) so this suggests you might wish to locate a used black and white TV receiver so that you can simultaneously "see" the display and watch satellite (or terrestrial) reception.

There are no knobs to twist or buttons to push; once connected, the system is automatic. To turn it off, pull the wall-wart power supply from the mains. There are some adjustments which you may wish to fiddle with (see above). The SpecMon provided to SatFACTS for test and evaluation has five adjustments as described immediately above. Use an insulated adjustment tool (small screw driver) if you insist on trying to improve on the factory's set-up. Read carefully our description of what each does *before* twisting and turning pot adjustments - *you have been warned!*

What we found is the SpecMon provides very useful information for a quite tiny price (below). We set it up on a PAS-2 dish, hooked it to a "junker" black and white TV set and using an erasable marking pencil traced over the display for PAS-2. When a new SCPC suddenly fired up, it was instantly recognised because the new display line did not correspond to those previously traced. Then we got smarter and cut some transparent plastic covers for the screen - each for a different satellite with its own "tracing."

The source is Av-comm Pty Ltd (www.avcomm.com.au; tel 61-2-9939-4377), price is A\$299, and delivery should be immediate. Not bad for a new way to "see" satellites.

MORE displays. The amplitude (right to left) can be adjusted (see above) but the relative strength between individual transponders or SCPC carriers (or analogue signals) is true and representative of actual bird.



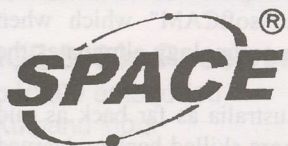


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FEEDBACK: The status of piracy (from May SF)

First you check into <http://www.hindin.com>, an Australian site. Now pull up their price list, go to the end of page two and read:

"I have been told it is possible to use the DVB-S (a product they offer for sale) without a CAM to receive encrypted services by using a program called MultiDec utilising your own keys from your subscriber card."

The site goes on to advise they are not a source for information on this topic. It doesn't have to be; there are many others.

"Are you aware that the Magic Module and the Magic Programmer (SF May, page 10) are now available through an Australian source?" (GV, Queensland) We are now www.mmdsatellite.com. The magic is Australia \$310 GST inclusive, the programmer A\$45.

The DVB-S is a PC plug in card made by WIN-TV NOVA (not related to Australia's WIN-TV satellite service). Model DVB-S slides into an unused slot on your Pentium II 400MHz (or higher) PC and it does for satellite TV what the (PC) TV Viewing card described on page 12 here does for terrestrial TV. It uses the processing power of your PC to turn your personal computer into a high quality, very flexible IRD. How flexible?

Well, when you connect your PC to satellite and any one of several widely known web sites (be patient - they are coming), the web site programming does for you what a paid subscription card would normally do. It decodes the encrypted data stream. Of course you can also use a subscription card directly as well.

"Hackers have discovered there are virtually no encrypted services which the WIN-TV card + software will not decode. Yes, even Videoguard by NDS." (Alan K, Victoria)

Hindin's site lists a number of encryption systems which it believes will function with the DVB-S PC card. They include Betacrypt, Conax, Cryptoworks, Irdeto, Nagravision, Seca, Viaccess and the recently available "Allcam" product. There is a warning here. A WIN-TV NOVA PC card, equipped with a suitable CAM (those working with the list just read), and energised with a paid for smart card is one level of "working". Eliminating the CAM, connecting to Internet and MultiDec for decryption less a card is a giant step upward. The WIN + CAM + card is simply another "IRD package" and a not especially inexpensive one (DVB-S WIN-TV Nova card - A\$499 + GST; a CI CAM interface adapter - A\$198.18, and, a

The rules

It is illegal to engage in any level of *distribution* of smart cards other than the original, unmodified, programmer/source products. Yes, that includes "gifting" cards to others without compensation. It is *not* illegal (Australia, NZ) to experiment in your own home with various smart card (or non-smart-card such as WIN-TV Nova PC plug-ins) "substitutes." However, providing detailed how-to information to others may be illegal under some circumstances - which is one of the reasons why nefarious web sites posting such information are typically short lived.

suitable CAM.) Take away the CAM and card and you are into a significant new skill level, even after attaching to MultiDec or a similar decryption resource. The DVB-S WIN-TV Nova card uses a technique known as "softCAM" which when connected to the MultiDec web site technology eliminates the need for a "real" CAM.

"SoftCAMs were available in Australia as far back as mid 2000; that's how many of today's more skilled hackers learned the secrets of Irdeto 1 manipulation. From that we grew into a country where cloned cards offering any one or a combination of Aurora, Foxtel and Austar services suddenly became common place. I am smiling to myself thinking that the same route will be followed with Irdeto 2 - first the softCAM technology, then ultimately the cloned cards (all over again)." (EE, Victoria)

If MultiDec and other web posted software hacks require more than the average level of home PC user skill, some believe Magic Module is a graduate course.

"I have one and work in PC programming for a living. I cannot recommend this package to a novice. It is almost too good, and certainly requires far more skill than calling up a web site and copying out some data streams to the module. Having posted that caveat, let me also note this is the future of smart card manipulation. The sites supporting the Magic Module are alive with hundreds of talented people trying out every conceivable way of making it do new things. But for most, it will be an exercise in frustration." (Donald R., WA)

Internet (Piracy) Site Updates - from May SF

Hardware

www.hindin.com
www.mmdsatellite.com

Videocrypt analogue

[http://mitglied.lycos.de/
nooperation.hVCPlus/](http://mitglied.lycos.de/nooperation.hVCPlus/)

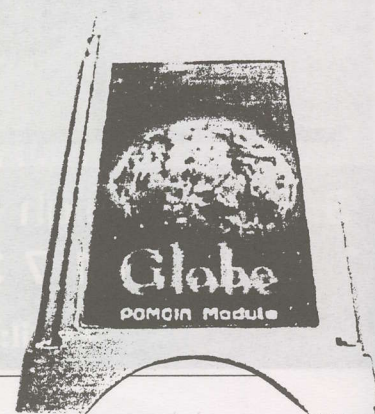
Videocrypt digital

<http://nds.host.sk>

Multiformat decoding

[www.netzagent.com/freetv/
index1.html](http://www.netzagent.com/freetv/index1.html)

AND next month's
big deal -
"Global CAM"





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HUMAX 5410Z Receiver

Irdeto V2.06 embedded
C & Ku band input
PAL/NTSC auto converter
>3000 channels
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA outputs
\$595

SPACE 8800a Receiver

Irdeto V2.09 embedded
C & Ku band input
DiSEqC1.0 control
TV/VCR Scart & RCA outputs
\$395

ARION 3300E digital receiver

C & Ku band input
PAL/NTSC auto converter
>3000 channels
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA outputs
\$290

SPACE 2200a digital receiver

C & Ku band input
PAL/NTSC auto converter
>3000 channels
DiSEqC1.0/1.2 control
TV/VCR Scart & RCA outputs
\$230

COSHIP 3288 digital receiver

C & Ku band input
>2000 channels
DiSEqC1.0/22K control
TV/VCR & RCA outputs
\$200

Optus Aurora Kit

Humax 5410Z Receiver
11.3 GHz Ku LNBF
90cm dish (Foxtel App.)
Wall mount bracket
\$750/set
Aurora card \$105

LBC, ART, Al Jazeera Kit

Space 8800a (Irdeto embedded)
Receiver
PBI 5.150 GHz C-band LNBF
1.8m panel dish
\$650/set
Subscription fee \$30/month*
* Condition apply

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Sky NZ's Special "case"

Three days after SF May hit the post office, New Zealand web site Aardvark.co.nz posted their daily news lead item, titled "Sky TV's UHF Service Cracked." Aardvark has been pummelling Sky since December when it published a series of highly critical reports concerning Sky's (digital satellite) software update that for many users had been a disaster. The May 16th story centred around use of a "TV viewing card" inserted into a suitable PC, fed by a UHF TV aerial (where Sky has such over the air service available), and software taken from the web which they claimed could be married to the analogue Videocrypt service displayed by the viewing card through the PC. Result, Aardvark said, was conversion of encrypted Sky to free to air Sky. Discussion group exchanges on the web quickly grabbed the topic and SF has followed it to its (we think) logical conclusion. Yes, there is such a card - several actually. PixelView PV-BT878p + FM is one. Dick Smith was selling a Dynalink TV View 99; ditto. PixelView Pro TV is a third. The "secret" is that only tuners with something called "the (Brooktree) BT848 chipset" are compatible. Pricing is in the region of NZ\$250. Then what? A PC with fast processing speed; 900 MHz is suggested for real time, flawless video, 50 frame decoding. Less processing speed (some report 450 MHz machines work borderline provided there is a good Internet connection), glitchy picture. Finally, extracting from the web real time Videocrypt software. <http://www.mitglied.lycos.de/nooperation.hVCPlus/>. Of course this is a German (de) site - *where else!* Web postings listed two firms (one Auckland, one Wellington) where the TV tuner cards could be purchased. SF telephoned both, neither wanted to hear from us - perhaps because they have already had some pressure exerted from - well, guess who. Alternate? The Hauppauge brand American sourced TV card (WIN-TV Nova from www.hindin.com). Or try Mark Francis (mark@pp.co.nz) concerning the ProLink module (and/or see www.prolink.com.tw/new_web/products/multimedia/PlayTVXP.htm.)

The status of various disputes

SF for May reported on the activity throughout the world in this very fast developing subculture of satellite TV. We reported that the Canadian Supreme Court had voted 7-0 ruling that Canadian homes subscribing to US satellite television were committing an illegal act. An estimated 700,000 homes are touched by the ruling, excluding another large (or larger) number who watch American satellite TV using piracy smart card products. For a week after the decision, a temporary injunction stopped the Royal Canadian Mounted Police (RCMP) from enforcing the rule - and when that expired, virtually every retail outlet throughout Canada dealing in cards had closed up shop. Essentially, American satellite TV has now become an underground, non-tax-paying cash business in Canada. And of course the fees being paid have gone up significantly.

In the still progressing California court case brought by Canal-Plus against News Corp subsidiary NDS, the judge has denied a NDS request to stop the lawsuit and another to move it to a southern California court so as to be, "closer to NDS USA's office." Canal-Plus is seeking triple damages totalling nearly US\$3 billion because, they claim, NDS not only reverse engineered the Mediaguard/SECA encryption software but made it public through postings on various (Canadian server based) web sites - a deliberate attempt to put Mediaguard/SECA "out of business." In affidavits filed with the court (as reported on MSNBC) after SF May went to press, there are new claims that NDS also reverse engineered the Swiss based NAGRA software used by America's "DISH Network" pay satellite service. The documents state a belief that when News Corp was negotiating with DISH and DirecTV to purchase one or both, Nagra cards were compromised and the information about busting their technology was posted on a web site for hacker use. The documents further suggest this was done in an attempt to force down the price of DISH and DirecTV stocks, making them less expensive for the would-be purchaser - News Corp. All of this legal activity has resulted in sell-offs of NDS and News Corp stock driving the price down throughout the world. If *any* of these charges are determined by the court to be true, Murdoch's empire will take

a direct financial hit of monumental proportions. The court's next activity should be a full blown trial but given the scope of the case and the likelihood it will drag on for six months or more, no confirmed date has yet been worked out for trial launch.

The close of iTV Digital continues to have repercussions. The British pioneering attempt to create a terrestrial television service combining free to air and pay elements shut down early in May in bankruptcy. A major element in the closure was the admission that for every 4 homes signing up for the service and agreeing to pay, 1 ultimately cancelled the service. And one of the elements in cancellation had to be the wide scale piracy of iTV Digital smart cards. Again, NDS was involved. It has *admitted* funding a UK operated - USA server based web site where instructions for hacking iTV Digital were posted. A recent suggestion that the site (Thoic.com) actually used a web site server physically located at a facility controlled by NDS America has added fuel to the speculation. iTV Digital was until its demise a direct competitor to News Corp's BskyB satellite service and had at one point considered (but deciding against) a proposal from NDS to use their Videoguard smart card technology. In fact, iTV Digital selected competitor Mediaguard/SECA. It doesn't take an Einstein to put 2 and 2 together, here.

SF for May also reported on the various illegal activities chipping away at the Sky NZ encryption system (prior to the Aardvark posting cited above). There is yet one more. Sky terrestrial analogue (VideoCrypt) uses set-top boxes which increasingly are available through grey/gray market sources. Sky in fact has an estimated 105,000 in stock in its own warehouses - units taken back in when terrestrial customers upgrade to Sky (satellite) digital. They also onsell these used decoders to offshore terrestrial pay-TV firms for as little as NZ\$20 each, in quantity.

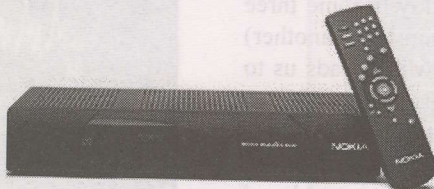
A New Zealand entrepreneur now offers the same \$20 wholesale box for NZ\$400. *His is different.* It has a "hacked" card inside which he claims allows the user to access the Sky terrestrial channels without a monthly fee. It had to happen sooner or later and is yet one more reason why Sky's future use of terrestrial UHF will be short term.

SATWORLD

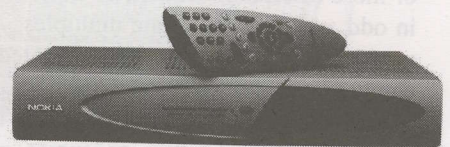
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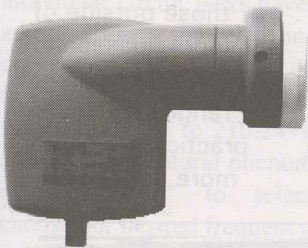


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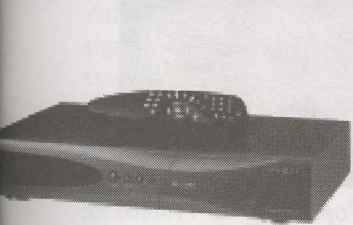


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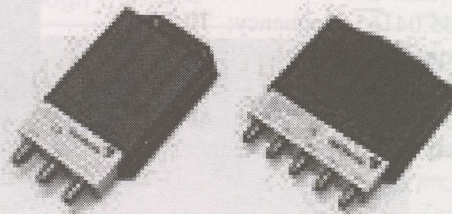
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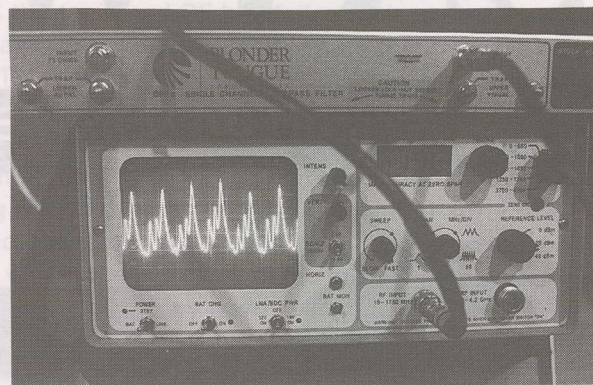
Filters/traps and bandpass devices

When a TV distribution system begins "mixing" channel sources, adding off air to satellite to VCR, a number of often complex new problems arise. Any modulator (transmitter) is capable of creating signal (transmissions) on more than its assigned, desired frequency. And when two or more separate channels are mixed together into a single transmission medium (cable), what started as two signals can quickly become three or more as separate channels "mix" (beat against one another) in odd and even harmonic multiples. All of which leads us to working out a system to kill unwanted signals which our own equipment generates quite against our planning.

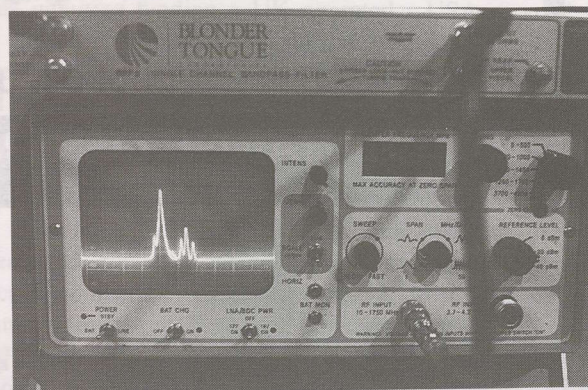
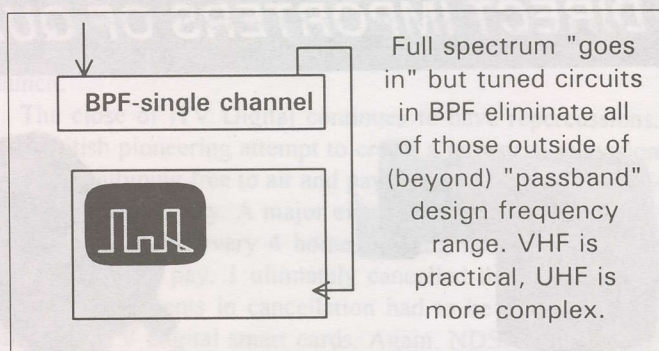
Any transmitter source, including TV modulators found in IRDs, VCRs and other consumer products, is capable of creating radio frequency signals on multiple frequencies. In a professional transmitter (such as used in broadcast TV or FM), the operating frequency is created in an "oscillator" stage, often at a frequency much lower than the final transmitter operating frequency. For example, a TV transmitter on channel E10 would operate on 210.25 MHz (visual carrier frequency). But creating a signal on this relatively high (band III) frequency is best done at a much lower frequency and then using frequency multiplication the transmitter progressively increases the operating frequency upwards.

For example, our crystal controlled precision oscillator generates a signal at 11.680555 MHz, a fraction of 210.25. Then the oscillator stage is "frequency multiplied" by 3 to 35.041665. This is possible because the original 11.680555 signal has "harmonics" - odd and even multiples of the original frequency. The third harmonic of 11.680555 will be just as frequency-stable as the original. The oscillator stage in the transmitter is followed by a "tripler stage" which is actually a tuned circuit or "filter" designed to pass through-itself only the third harmonic on 35.041665. But we are still some frequency-distance from our desired 210.250 MHz.

So following the tripler stage functioning at 35.041665 we now build a "doubler stage" which has a pass-through filter designed for two times the 35.04165 frequency; 70.08333 MHz. Once again the new frequency can be amplified and a "harmonic" of itself can be "picked off" by yet a higher frequency multiple of 70.08333. If we "triple" from 70.08333, the new frequency is 210.24999 (210.250), our original desired transmission frequency.



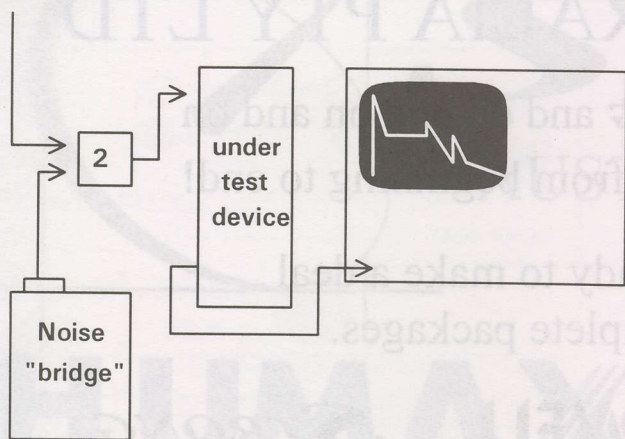
WHAT 6 adjacent channels "look like" on spectrum analyser prior to addition of single channel bandpass filter (above).



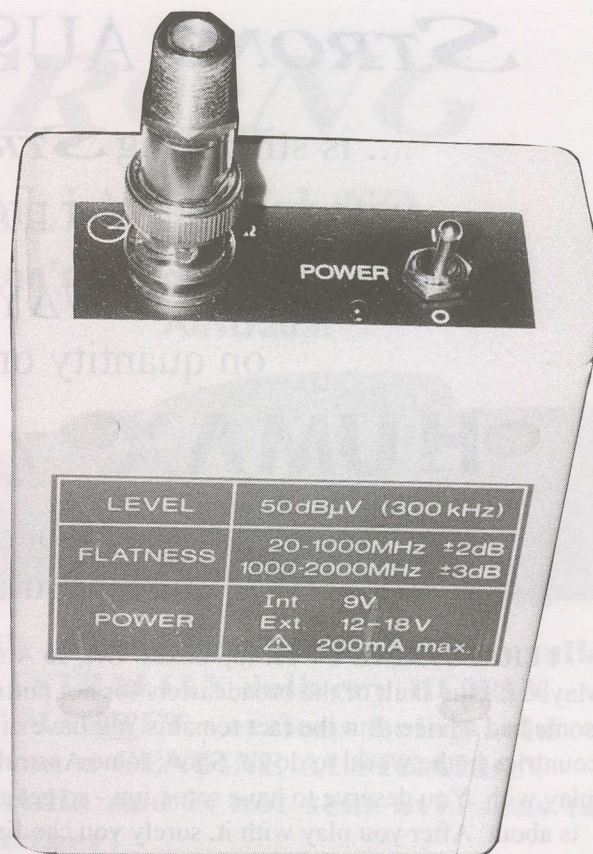
Each individual stage, whether operating at 11.680555, 35.041665, 70.08333 or 210.24999, operates because

EVERYTHING goes in (the full TV spectrum) but only one TV channel comes "out." BPF (bandpass filter) is one device which can "extract" a channel from a system.



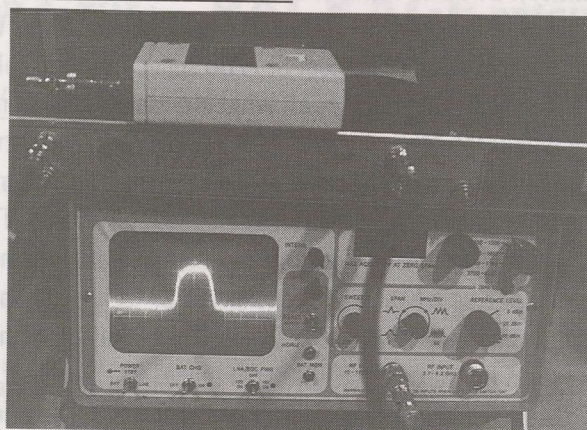


INDIVIDUAL carriers appear on normal spectrum analyser (video is left, colour sub-carrier is next to right, aural carrier is at far right) but 6/7/8 MHz wide "passband" is not displayed. By mixing a wideband noise generator source with the BPF selected single TV channel, the TV carriers become "markers" against the BPF passed bandpass of the single channel filter, showing the true full-channel characteristics of the BPF. Wideband noise gen is in this case (right) from Promax, model NG-282, outputting 20-2,00 MHz.

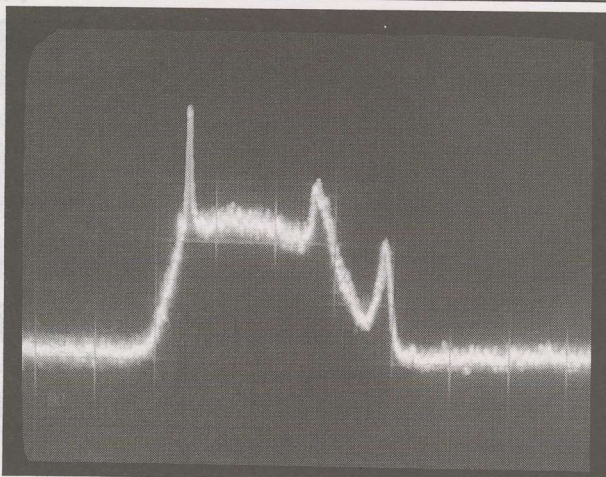


individual circuit parts have been adjusted to "resonate" (function) only at or close to the desired frequency. And along the way from 11.680555 to 210.24999 we are using the natural phenomenon of "harmonics" to selectively choose our desired frequency.

Why not start off at 210.250 in the first place? The major reason against this is stability. Professional broadcast transmitters must maintain a very high degree of "frequency stability" to ensure their radiated signals do not interfere with other communication systems in the same geographic region. The best guarantee of frequency stability is a "quartz crystal" oscillator and the technology of such devices is that stability is always far better at a lower frequency (such as 11.680555 MHz) than at a higher frequency. But if our transmitter quartz crystal oscillator at 11.680555 can produce a tripler signal at 35.041665 MHz as well, and that tripler stage can produce another harmonic at double the frequency or 70.08333, are there not also other "double" and "triple" signals being generated as well?



LESS the carrier markers - what spec an display looks like when only the noise gen is fed through the BPF.



WITH the carrier markers- same channel (E10) with BPF-passed channel "mixed" with noise.

Which is what leads us to "signal traps" and "bandpass filters." An obvious technical challenge will be our example. The FM broadcast band is generally between 88 and 108 MHz. A FM transmitter broadcasting on any frequency between 88.1 and 107.9 (the nominal lower and upper limits of FM) will quite within the rules of physics also radiate (broadcast) a small amount of signal at double the operating frequency. An FM transmitter on any frequency between 88.1 and 107.9 will "leak" (radiate) measurable signal at some point between 176.2 and 215.8 MHz. Australia has band III TV channels at 7 MHz spacings from 175.25 (182.25, etc.) through 216.25. New Zealand has similar terrestrial assignments. An FM band transmitter radiating 20 kilowatts at 99.9 MHz can quite legally be also radiating close to 1 watt at 199.8 MHz - TV channel 9 in Australia, 7 in New Zealand.

Once radiated into the air, whether at a legal signal level or not, the only way to eliminate the interfering signal at a nearby receiving site is to use a filter or

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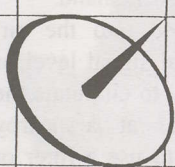
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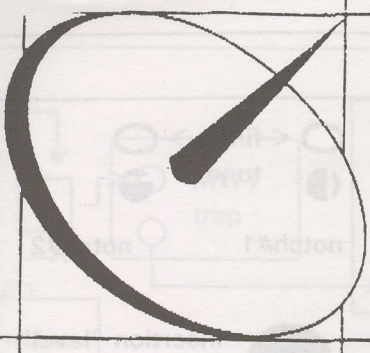
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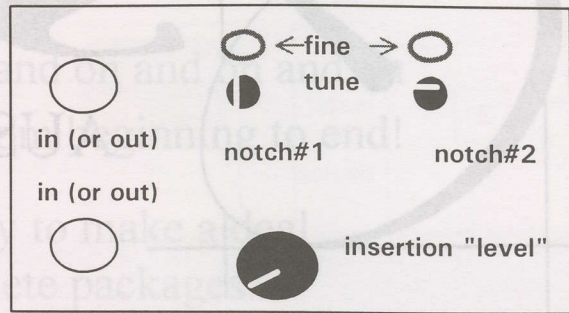
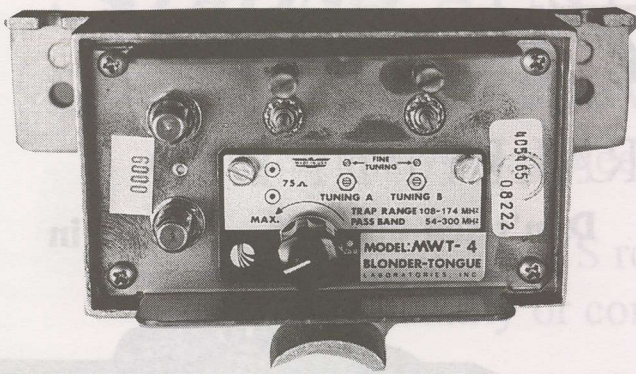
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trap which "nulls" or eliminates the interfering signal in your receiving equipment.

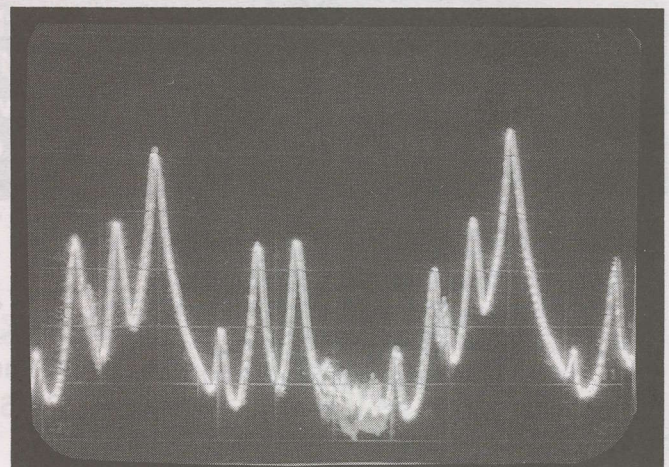
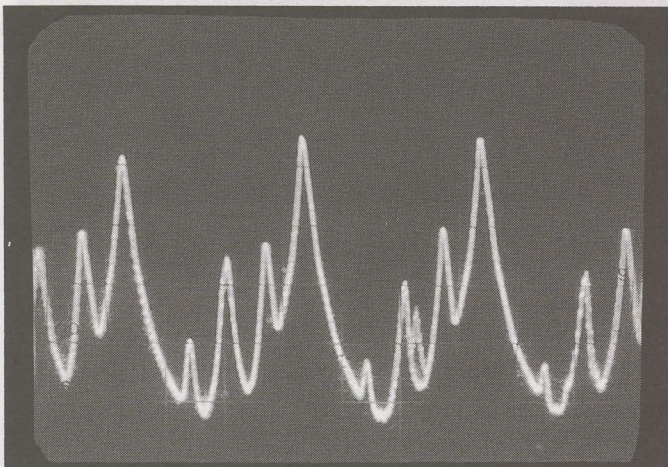
In a SMATV/CATV environment, where you actually generate many separate TV channels in a physically confined space, the opportunity for some "harmonic" signals to appear where you don't want them is great. Most MATV/SMATV/CATV grade "modulators" rely upon PLL (phase lock loop) oscillators, something quite different in design from the crystal oscillator and multiplication chain of professional broadcast transmitters. PLL devices generate single TV channel signals without the requirement for a crystal oscillator. This makes PLL modulators significantly less expensive - but unfortunately, designers take short cuts to save even more money and the result more often than not is extra, unwanted signals.

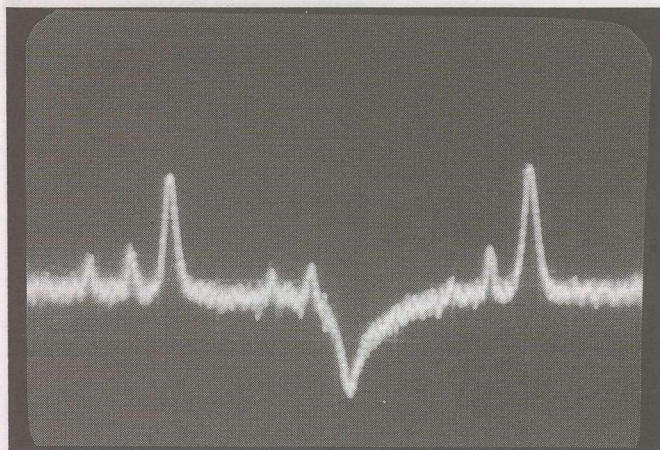
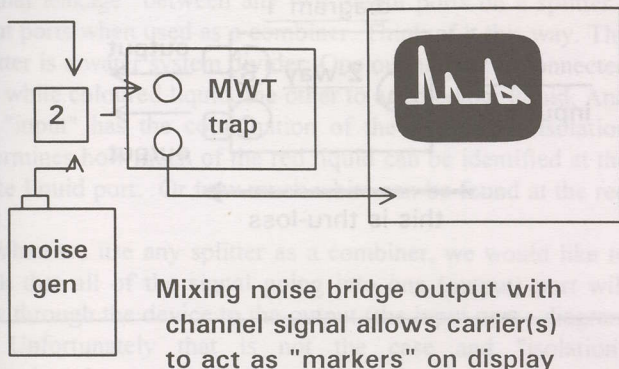
Another MATV/SMATV/CATV system problem is created by the channel mixing systems employed. Channels can be married together for distribution in a single cable by using signal splitters (backwards) as "combiners" or more correctly by employing combiner networks. Either approach allows the output of one channel modulator to not only go "forward": through the cable system but unfortunately also "backward" into the output of other connected modulators. We normally visualise all signals going "forward" only - from the modulator through the combining network and then into the distribution cable. Alas, when two channels are "mixed" in a 2 (3) (4) (6) (8) way splitter, each channel's output ends up in every other channel's output stage - going backwards towards the output stage of similar connected modulators. When two (or more)

separate modulator signals "beat together" inside of a circuit, they produce new, related frequencies which quickly become troublesome to the system. A TV modulator operating on 175.25 (channel 7 in Australia, 5 in NZ) combined through splitters or a combiner network with another modulator operating at 119.25 (channel S3) can produce a "difference mix beat" (175.25 - 119.25) of 56.0 MHz. This new 56.0 MHz signal, created because the two signals "beat together" in the combining circuits or output stage of one of the modulators, falls into the TV channel extending from 54 to 61 MHz (channel 2 in NZ and very close to the Australian channel 1-56 to 63 MHz). This "beat" signal is real, can be seen on a spectrum analyser, and will create a herringbone interference pattern on the screen for reception of the 54-61/56-63 MHz channel if used by the cable distribution system. The same two original signals (119.25 and 175.25) will also "beat" to create a new "sum" frequency (119.25 + 175.25 = 294.50 MHz), which is almost directly on top of the video carrier frequency for channel S20 (294.25 MHz).

Sum and difference frequencies can be created in totally passive devices - a single splitter used as a combiner, with no "active" (electricity powered) parts, has everything required to "mix" sum and difference signals internal to itself. In the real world, totally passive unrelated devices such as metal stock fences, metal water tanks, even metal yard fences have been found to be capable of "mixing" locally strong radio or TV signals. In a MATV/SMATV/CATV headend, a slightly loose shield portion on a "F" connector can become a "mixing device." And all of this leads us to fixes.

CASE of the disappearing carrier. Left, full 3 (adjacent) channel spectrum. Right, video carrier from "middle" channel is "gone" - lost (dumped) by the MWT (tuneable trap) inserted in the line and adjusted using SLM (signal level meter) as signal reference / read-out tuning device (see text).





Bandpass filters

A bandpass filter (BPF) is what the name implies - it has a designed-for "pass band" (such as a single TV channel from 209 to 216 MHz; E10 as illustrated here). An entire spectrum loaded with TV channels can be plugged into the device but at the output, *only one* emerges. Bandpass filters are often included inside of higher quality modulators, always included in TV and FM broadcast transmitters. In our E10 channel BPF shown here, we show several ways to check its performance or even tune it up (a warning however - twiddling on the adjustment screws is not a job for an amateur - guaranteed you will make it worse before you make it better!). There is one clever wrinkle here - it is usually better to be able to "see" on a spec-an the full TV channel and not merely the individual carriers. By using a broadband noise source and mixing the TV channel signal with the noise source, your spec-an paints a

complete image of the passband, not simply the carriers passed.

Tuneable trap

If you wish to eliminate a single interfering carrier, a tuneable trap is the correct device. With careful adjustment using either a spec-an, spec-an with noise bridge or signal level meter, you can isolate and attenuate an interfering signal by up to (-) 60 dB. Traps are available from a number of sources, each model designed to "cover" a portion of the spectrum (such as "Trap 108 - 174") while passing (not attenuating) the balance of the spectrum. A trap is a single carrier device - adjusted to eliminate the one signal you don't want in the system, but passing all others through. Sources include Blonder Tongue Labs, Inc. as shown here (www.blondertongue.com) or through Toner Cable Equipment, Inc. at www.tonercable.com.



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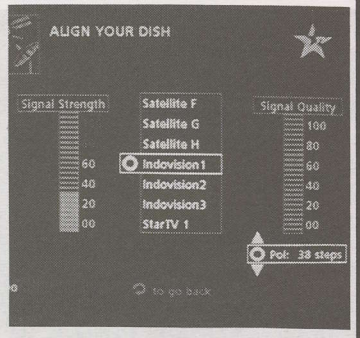
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Teck Topics



Splitters and isolation

When combining two or more TV channels (without respect to the sources or signal levels involved), there is a caveat which strongly suggests you should not do this by using a splitter, backwards, as a combiner. In fact, if precautions are taken, it is possible to use signal splitters as combiners and achieve results that are close to doing the same thing with purpose-designed "headend combiners."

It is said that "splitters have loss" but in fact they "lose" very little - rather they divide the input signal into 2, 3, 4, 6 or 8 different output ports. Think of it as taking a litre of milk and dividing it into some number of exactly equal amounts. Nothing is "lost," it is merely repackaged.

The amount of signal at each output port depends totally upon (1) the amount of input signal, and, (2) the number of parts we are creating in the division. The following are benchmark numbers.

# of ports	"loss"/port	#ports	"loss"/port
2	3.4-4.0 dB	4	6.5-7.5 dB
3	5.2-5.5 dB	8	10.5-13 dB

Thru-loss is the end result of dividing the input signal into equal parts. For example, if you begin with 70 dBuV at the input and feed it into a 2 way splitter, each output port will now have between 66.5 and 66 dB. In a 3-way, between 64.8 and 64.5 dB. In a 4-way, between 63.5 and 62.5. And in a 8-way, between 59.5 and 57 dB (see diagram 1).

If the same splitter is used for combining two (or more) signals, and the input signal from a modulator or other device is 100 dBuV, as connected to one of the output ports (diagram 2), the output signal level appearing at the normal-input port of the splitter will be: 2-way/ 96.6 and 96 dB; 3-way/ 94.8 and 94.5 dB; 4-way/ 93.5 and 92.5 dB; 8-way/ 89.5 and 87 dBuV.

Unfortunately splitters have become a "cheap-cheaper-cheapest" commodity and while you may believe "all similar function splitters work about the same," that is simply untrue. Here's how you can tell a quality splitter from a lesser grade. *Measure it.* Start with the table above and if the splitter's signal losses fall within the ranges shown (i.e., 3.4 - 4.0 dB for a 2-way and so on), that is a positive indicator. But there is one more test which separates the not so good from the quality devices.

In diagram 3, we see there is something called "port to port isolation." What that means is, "how much signal appearing at port (B) in our diagram will appear at port (C)? Cheap splitters have a lower (lesser) amount of isolation. Higher quality splitters have more. The range between splitters that perform the same function (such as 2-way split) is rather wide. And it also depends upon the frequency range for which the splitter

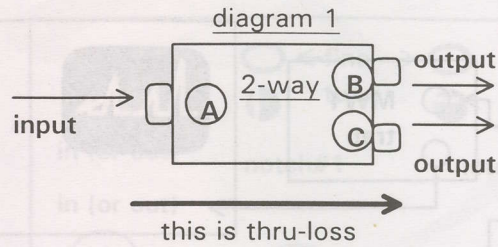


diagram 2

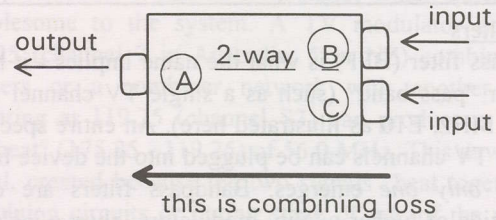


diagram 3

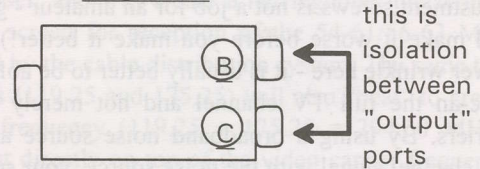
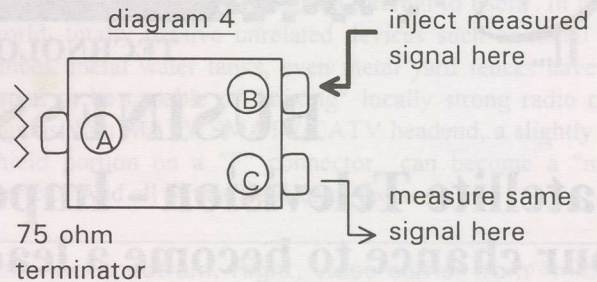


diagram 4



will be used (regardless of it being used as a splitter or as a combiner). Here is a range of isolations measured by SatFACTS using a random sampling of commercially available splitters (see diagram 4 and what follows).

# of ports	50 MHz	500 MHz	800 MHz
2-way worst	14 dB	16 dB	18 dB
2-way best	27 dB	27 dB	27 dB
3-way worst	20 dB	18 dB	18 dB
3-way best	27 dB	27 dB	27 dB
4-way worst	20 dB	19 dB	18 dB
4-way best	27 dB	27 dB	27 dB
8-way worst	18 dB	18 dB	18 dB
8-way best	27 dB	27 dB	27 dB

Isolation as defined in diagram 3 determines the amount of "signal leakage" between any two output ports on a splitter - input ports when used as a combiner. Think of it this way. The splitter is a water system divider. One output port is connected to a white coloured liquid, the other to a red colour liquid. And the "input" has the combination of the two. Now, isolation determines how much of the red liquid can be identified at the white liquid port. Or how much white can be found at the red port.

When we use any splitter as a combiner, we would like to think that all of the signal going into one (output) port will flow through the device to the output (the input port - diagram 2). Unfortunately that is not the case and "isolation" determines how much of the original signal ends up in the wrong place - at another signal input port.

18 dB of isolation means that if you inject a signal at port (B) in diagram 4, and then measure the "signal leakage" at port (C), it will be -18 dB reference the (B) input level.

In diagram 4, you have a quick, reasonably accurate way to "grade" that box of splitters in your shop. First place a 75 ohm terminator on the splitter's normal-input port. That creates an appropriate "impedance matching load" for the test. Next, with a 2-way splitter, select one port as the input and using some sort of test signal(s) measure the level going into the splitter-as-a combiner port. If you have a frequency range of signals available (covering VHF and UHF) make and record the measurement numbers at least 3 frequencies between the lowest available and the highest.

Now connect a signal level meter or spec-an to the "other" (2-way splitter) port and measure the same signal(s) again, recording the results. The difference between the two is "isolation."

If the splitter is a 3, 4, (6) or 8-way, place a 75 ohm terminator on all but the port selected for the input and the port selected for isolation measurement. It may also be useful to measure each of the ports for those with 3 or more outputs - not assuming all are equal (although it would be logical to assume they would be). And it would also be informative in the case of a 2-way to reverse the leads for at least one measurement - the port initially used for signal source becomes signal isolation measurement and the original isolation port becomes the signal source.

And this tells you?

Which splitters are best to use for combining purposes. As we located splitters from 2 to 8-way with 27 dB of "port to port isolation" and none any better, it follows you should settle for nothing less yourself.

Can't you rely upon the supplier for these numbers. Absolutely not. First, a high percentage of the Asian built splitters do not bother to "accurately specify" the isolation (and loss) numbers. And of those that do, well - we found several which apparently "cribbed" (copied) some other manufacturer's numbers. One claiming 27 dB was barely 14. So much for specification integrity.

How does 27 dB compare with a purpose-built headend combiner? These vary between 24 and 32 dB port to port isolation. Of course the larger the number the better the combiner works to keep unwanted signals away from and out of the incorrect ports. Using the technique in diagram 4, you can do your own port to port isolation measurements with a headend combiner as well. However, keep in mind that when measuring between any two ports, all of the other ports on the device must be (75) ohm terminated during the testing.

EXPANSION MINDED???

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

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	
Thcm3/7R.5	SkyChAust	3695/1455V	up to 3	3/4	5(.000)	
	MRTV-Myn	3676/1474H	1	2/3	6(.000)	
	MidEst Mux	3640/1510H	up to 12	3/4	28(.066)	
	Mahar/DD1	3600/1550H	up to 8	3/4	26(.661)	
	ME Mux	3569/1581H	up to 4	3/4	9(.000)	
	Nepal TV+	3554/1596V	3+ in mux	3/4	13(.333)	
	JAIN TV	3551/1600H	4+ TV, radio	3/4	13(.330)	
	JAIN TV	3538/1612V	1TV	3/4	3(.300)	
	PTV1 +	3521/1629V	1TV, 1 radio	3/4	3(.333)	
	TARBS	3520/1630H	unknown	3/4	28(.062)	
	TARBS/Ths	3480/1670H	6+ TV?	3/4	18(.180)	
	Thai Global	3425/1725V	up to 7?	2/3	27(.500)	
InSat 2E/83	ETV mux	4005/1145V	6+ TV	3/4	27(.000)	
	DD2	3910/1240V	1	3/4	5(.000)	
	DD National	3830/1320V	1	3/4	5(.000)	
	Kairali TV	3699/1451V	1	3/4	3(.184)	
	AsiaNet	3683/1467V	1	3/4	4(.340)	
	Jaya TV	3615/1535V	1	3/4	3(.255)	
	ETV Mux#2	3485//1665V	4+TV	3/4	27(.000)	
	ST1/88E	MMBN	3632/1518V	12TV	3/4	26(.667)
	As2/100.5E	Euro Bouqt	4000/1150H	6TV, 21r	3/4	28(.125)
		5-Star Med	3951/1199H	3TV	3/4	13(.185)
WorldNet		3880/1270H	4+/28radio	1/2	20(.400)	
Hubei/HBT		3854/1296H	1	3/4	4(.418)	
Hunan/SRT		3847/1303H	1	3/4	4(.418)	
Guan/GDT		3840/1310H	1	3/4	4(.418)	
In. Mongolia		3828/1322H	2	3/4	8(.397)	
APTN Asia		3799/1351Hz	1	3/4	5(.632)	
Reuters/Sing.		3775/1375H	1	3/4	5(.631)	
WorldNet/US		3764/1386H	1 + 20 radio	3/4	6(.100)	
Liaonin/Svc2		3734/14161I	1	3/4	4(.418)	
Jiangx/JXT		3727/1423H	1	3/4	4(.418)	
Fujian/SET		3720/1430H	1	3/4	4(.418)	
Hubei TV		3713/1437H	1	3/4	4(.418)	
Henan/Main		3706/1444H	1	3/4	4(.418)	
Egypt/Nilesat		3640/1510H	7+, radio	3/4	27(.850)	
As2/100.5E		Feeds	4086/1064V	1	3/4	5(.632)
		Dubai MUX	4020/11430V	4+, radio	3/4	27(.500)
		Jilin Sat TV	3875/1275V	1	3/4	4(.418)
		HeiLongJian	3834/1316V	1	3/4	4(.418)
		JSTV	3827/1323V	1	3/4	4(.418)
		Anhui TV	3820/1330V	1	3/4	4(.418)
	ShaanxiQQ	3813/1337V	1	3/4	4(.418)	
	Guan/GXTV	3806/1344V	1	3/4	4(.418)	
	Fashion TV	3795/1355V	1	3/4	2(.533)	
	MSTV	3791/1359V	1	3/4	4(.340)	
	Myawady	3766/1384V	1	7/8	5(.080)	
	Saudi TV1	3660/1490V	5+/tests	3/4	27(.500)	
	As3S/105.5	Zee bouquet	3700/1450V	10TV	3/4	27(.500)
		Macau MUX	3713/1437G	2TV	3/4	5(.868)
		Arirang TV	3755/1395V	1	7/8	4(.418)
		Now TV +	3760/1390H	4+ TV	7/8	26(.000)
		Star TV	3780/1370V	22(+TV)	3/4	28(.100)
		Star TV	3860/1290V	18(+TV)	3/4	27(.500)
Star TV		3880/1270H	19(+TV)	7/8	26(.850)	
Indus Music		3900/1250V	5TV	7/8	27(.895)	
Star TV		3940/1210V	9(+TV)	7/8	26(.850)	
CNNI		3960/1190H	6(+TV)	3/4	27(.500)	
StarTV		3980/1170V	2+TV	3/4	28(.100)	
Star TV		4000/1150H	10(+TV)	7/8	26(.850)	
Sun TV		4095/1055H	1	3/4	5(.554)	
CCTV bqt		4129/1021H	4(+ TV)	3/4	13(.240)	
Zee Bqt #2		4140/1010V	8(+ TV)	2/3	22(.000)	
Cak1/107.5	Indovision (S-band)	2.536, 2.566, 2.596, 2.626	33(+ TV)	7/8	20(.000)	
	IndoBqt	3460/1690H	up to 6	3/4	28(.000)	
T'Kom/108E	TPI	4185/965V	1	3/4	6(.700)	
C2M/113E	Anteve	4144/1006V	1	3/4	6(.510)	

Receivers and Errata

Finally settled here from As2
erratic service
Now essentially all CA
USA religion chs, CMM music FTA
New November - possibly TARBS?
FTA + CA mux
3 Angels USA, Ch of Hope, + 9 radio
new here April, PIDs 4132/4133
recent frequency change
MUX testing
TARBS labell, CA-no SIDs
FTA (reaches SE Australia)
Several ETV now here; wide beam
SCPC, OK E. Aust. wide beam
SCPC; OK E. Aust. wide beam
SCPC, OK E. Aust wide beam
SCPC, OK E. Aust wide beam
SCPC, OK E. Aust. wide beam
Several new ETV here, wide beam?
Nagravision, some FTA; erratic
FTA; MCM gone
Macau MUX
FTA; Now here full time
FTA SCPC, teletext
FTA SCPC, teletext
FTA SCPC, radio APID 81
FTA: #1 Mongolian, #2 Mandarin
Sometimes FTA; also 3895Vt
FTA & CA
FTA; to shut down "soon" (see 3880H)
FTA SCPC, radio APID 256
FTA SCPC, teletext, radio APID 81
FTA SCPC, + radio APID 80
FTA SCPC, radio APID 80
FTA SCPC, + radio
Thru TARBS Aust, occ. FTA
FTA SCPC feeds
FTA including sport
FTA SCPC, + radio
FTA SCPC
FTA SCPC, + radio
FTA SCPC + radio
FTA SCPC, radio APID 81
FTA SCPC, radio APID 257
Now Irdeto version 2 CA
FTA SCPC
FTA SCPC - difficult to load
FTA MCPC
Mediaguard CA; 2 FTA
New June 2002; low res MUX
FTA SCPC; reported audio problems
CA + NOW, Bloomberg FTA
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DVS211, Zenith)
NDS CA (Pace DV211, Zenith)
PAL, NTSC, 1 ch CA
NDS CA as above
PowVu CA; new SR Apr 29
NDS CA (Pace DVS211, Zenith)
NDS CA + 4(Chinese) FTA
"History Channel" testing SCPC
moved from 4115
Mediaguard CA
NDS CA using RCA/Thomson,
Pace IRDs
also 3586H/17.500, 3496H/19.615
FTA SCPA, NT/NC only
change from 4055V; FTA SCPC

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	
(C2M)	Indo Mux	4080/1070H	5+ TV	3/4	28(.125)	
	Indosiar	4074/1076V	1	3/4	6(.500)	
	SCTV	4048/1102V	1	3/4	6(.618)	
	Indone.Mux	4000/1250H	6+TV	3/4	26(.085)	
	Satelindo	3935/1215H	1TV	3/4	6(.700)	
	TPIN	3924/1226H	1TV	3/4	5(.632)	
	Indo. MUX	3880/1270H	3+ TV	3/4	28(.125)	
	Brunei/Sing	3733/1417H	1TV	3/4	6(.000)	
	RCTI	3473/1677H	1	3/4	8(.000)	
	Myawad TV	3706/1444H	1	3/4	5(.924)	
Jc3/12	Miracle Net	3996/1154V	3 up to 6	5/6	22(.000)	
	Asian bqt	3960/1190V	up to 8	7/8	30(.000)	
Meas2	Astro Mux	11.602H (+)	up to 10TV	3/4	41(.500)	
3/156	Mediasat	12.336V/T2	5TV, 3 radio	2/3	30(.000)	
	Aurora	12.407V/T3		2/3	30(.000)	
	Aurora	12.532V/T5	Inc Zee TV	2/3	30(.000)	
	Aurora	12.595V/T6		3/4	30(.000)	
	Aurora	12.657V/T7	TV tests	2/3	30(.000)	
	Aurora	12.720V/T8		3/4	30(.000)	
	Austar	12.314H/T9	iTV + here	3/4	30(.000)	
	Austar/Optus	12.376H/T10		3/4	29(.473)	
	Austar/Foxtl	12.438H/T11		3/4	29(.473)	
	Austar/Foxtl	12.501H/T12		3/4	29(.473)	
	Austar/Foxtl	12.564H/T13		3/4	29(.473)	
	Austar/Foxtl	12.626H/T14		3/4	29(.473)	
	Austar/Foxtl	12.688H/T15	(some FTA ra)	3/4	29(.473)	
	B1/160	ABC NT fd	12.258V	1TV, 3 radio	3/4	5(.026)
		ABC feeds	12.317H	1	3/4	6(.980)
Net 7 service		12.367H	1	3/4	7(.200)	
Central 7		12.354H	1TV	3/4	3(.688)	
Imparja mx		12.360H	1	3/4	5(.424)	
Sport feeds		12.420V	1	3/4	6(.110)	
Mediasat#3		12.424H	3+ TV	2/3	19(.900)	
TVNZ DTH		12.456V	2TV	3/4	22(.500)	
Nine Net		12.512H	1 TV typ.	3/4	5(.632)	
Sky NZ		12.519/546V	7TV/7TV	3/4	22(.500)	
Sky NZ		12.581/608V	6TV/6TV	3/4	22(.500)	
ABC Mux		12.606H	4TV	3/4	14(.300)	
Sky NZ		12.644/671V	9TV	3/4	22(.500)	
ABC HDTV		12.670H	5TV	7/8	14(.300)	
Tel/Saturn		12.707/733V	8+TV	3/4	22(.500)	
P8/166	ABC A-P	12.301H	1TV, 2 radio	5/6	5(.858)	
	TARBS3	12.326H	13TV + radio	3/4	28(.067)	
	TARBS	12.526H	13TV + radio	3/4	28(.067)	
	TARBS2	12.606H	13TV + radio	3/4	28(.067)	
	TARBS5	12.646H	testing	3/4	28(.067)	
	TARBS4	12.726H	13TV + radio	3/4	28(.067)	
	JEDI/TVB	12.686H	11+ TV	3/4	28(.126)	
	ABC A-P	4180/970H	2TV, 2 radio	3/4	27(.500)	
	Disney Pac	4140/1010H	typ 6 TV	5/6	28(.125)	
	NHK Joho	4065/1085H	7TV, 1 radio	3/4	26(.470)	
	ESPN USA	4020/1130H	7+TV, data	7/8	26(.470)	
	Discovery	3980/1170H	8 typ.	3/4	27(.690)	
	CalBqt/Pas8	3940/1210H	up to 8TV	7/8	27(.690)	
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)	
	TaiwanBqt	3860/1290H	12TV + 30 radio	5/6	28(.000)	
CCTV Mux	3839/1311H	up to 4	3/4	13(.240)		
EMTV PNG	3808/1342V	1 + 2 radio	3/4	5(.632)		
CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)		
MTV	3740/1410H	8	2/3	27(.500)		
P2/169	Pv Bouquet	12.281V	2+ TV, radio	2/3	27(.500)	
	WA PowVu	12.637(.5)V	4TV, 8 radio	1/2	18(.500)	
	TVB Mux	4026/1124V	up to 8	3/4	22(.000)	
	Fox Bouquet	3992/1158V	8TV/data	7/8	26(.470)	
	Feeds	3966/1184V	1	2/3	6(.620)	
	Feeds	3957/1193V	1	2/3	6(.620)	
	Feeds	3929/1221V	1	3/4	10(.850)	
	Feeds	3912/1238V	1	2/3	6(.620)	
	Feeds	3898/1252V	1	2/3	12(.000)	
	Middle East	3836/1314V	4 typ	3/4	13(.331)	
	Feeds	3803/1347V	1	3/4	6(.000)	
	BBC +	3743/1407V	3	3/4	21(.800)	

Receivers and Errata
Global TV - frequent changes in lineup
FTA; solid on 3.5m in New Caledonia
FTA SCPC; NT/NC only
unstable platform - testing?
Test card only reported
New Feb 2002; also 3718H, same parm
TVRI, others FTA
FTA; share time, Brunei-23hrs, Sing 1h
FTA SCPC, Australia OK
may be test; svc has been erratic
PowVu, some FTA (ch # 1,3)
CA & FTA NTSC: Japan, Taiwan
Aust East beam - FTA + CA
FTA - TRT+, Zee CA, feeds
Aust, NZ 90 cm; CA (*); ABC Nat
cvrs Aust, NZ 90 cm; CA (*)
Aust only; * - smart card p. 26
cvrs Aust, NZ 90cm (Optus FTA test)
Aust only; * - smart card p. 26
Austar i-TV; CA, subs avail. Aust.
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
CA, subscription available Australia
V832, A833
also 12.326, 12.335; ex PAS8 Ku
Full schedule less commercials
VPID1280, APID 1281
VPID 1024, APID 1025, PCR 1024
Weekend footy feeds reported-FTA
FTA 2 channels; more possible
testing digital feeds
NDS CA, subscription available NZ
NDS CA, subscription available NZ
ABC K, ABCFly, ABC WA, test card
NDS CA, subscription available NZ
also 12.686 12.706H; ABCVic, Qld
NDS, Wellington uplink
Feed, Adelaide; not permanent
TPG/EurodecMDS CA, occ. FTA
TPG/Eurodec MDS CA, radio FTA
TPG/Eurodec MDS CA; TRT FTA
TPG/Eurodec MDS CA
TPG/Eurdec MDS CA; Thai TV, FTA
Irdeto CA, some FTA tests
Dateline west; east PAS2, 3901
PowVu CA
PowVu CA & FTA; subscription avail
PowVu CA; ch 11 DCP-CCP bootload
PowVu/CA (some audio FTA)
PowVu CA & FTA (EWTN)
FTA at this time
new TV chs, FTA at this time
PowVu FTA, replaces PAS-2 svc
was As2; PowVu CA
PowVu, CNN/CNNI now CA
#2, 8 MTV China FTA; rest CA
PowVu CA, WIN, ABC NT
PowVu CA, WA only - D9234
CA feeds to pay-TV; 6 chs FTA
Pv, CA/FTA (FTA ch3, 5
PowVu (FTA) occ feeds
PowVu (FTA) occ. feeds
PowVu (FTA) occ sport feeds
PowVu(FTA) occ. feeds
PowVu (FTA) occ. feeds
RAI TV, radio FTA; balance CA
PowVu (FTA) occ sport feeds
BBC FTA, others CA usually

SatFACTS Digital Watch: Supplemental Reference Data / June 2002

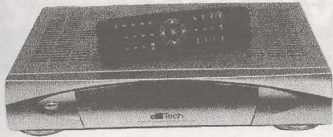
Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym
(PAS-2/169)	Feeds	4040/1010H	1	3/4	10(.850)
	7thDayAdv.	3872/1278H	1	3/4	6(.620)
	Feeds	3868/1182H	1	2/3	6(.620)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498)
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)
	HK bouquet	3850/1300H	up to 8	2/3	24(900)
	occ feeds	3776/1374H	1 typ	3/4	5(.560)
	Korean Bqt	3762/1388H	up to 3	3/4	11(.570))
I702/176E	AFRTS	4177/973LHC	8TV, 12+radio	3/4	26(.694)
	RFO Poly	4027/1123L	1TV	3/4	4(566)
I701/180E	TNTV	11.060&11.514	9	3/4	30(.000)
	Canal+Sat	11.610H	16TV, 1 radio	3/4	30(.000)
	TVNZ	4195/955RHC	1	3/4	5(.632)
	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)
	TVNZ	4178/972RHC	1	3/4	5(.632)
	TVNZ/Aptn	4170/980RHC	1	3/4	5(.632)
	TVNZ/feeds	4161/989RHC	1	3/4	5(.632)
	RFO-Canal+	4086/1064L	4TV, radio	5/6	12(.041))
	TVNZ/feeds	4052/1098RHC	1	3/4	5(.632)
	TVNZ feeds	4044/1106R	1	3/4	5(.632)
	NZ Prime TV	4024/1126L	1	2/3	6(.876)
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)
	WorldNet	3886/1264R	1TV, 37 radio	3/4	25(.000)
	Ioarana	3772/1378L	1	3/4	4(.566)
	TVNZ	3846/1304R	1	3/4	5(.632)
	10 Australia	3769/1381R	4	7/8	20(.000)
	USA feeds	3749/1401R	4?	?	26(400)

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

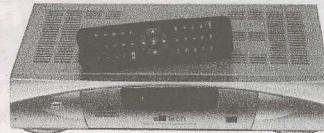
MPEG-2 DVB Receivers: (Data here believed accurate; we assume no responsibility for correctness!)

AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. Av-COMM Pty Ltd, 61-2-9939-4377.
AV-COMM R3100(A). FTA, good sensitivity, ease of use exc (review SF May 2002). See above contact.
Benjamin DB6600-Cl. FTA, Foxtel/Austar w/CAM+card. Autosat Pty Ltd 61-2-9642-0266 (review SF#72)
eMTech eM-100B (FTA), eM-200B (FTA + Clx2), eM210B (FTA + 2xCl + positioner); KanSat 61-7-5484 6246 (review SF#89)
Humax F1-Cl. Primarily sold for TRT(Australia), does (limited) PowerVu (not Optus Aurora approved).
Humax ICRI 5400. Embedded Irdeto + 2 CAM slots; initial units had NTSC glitch, now fixed. Widely available, review SF#76.
Hyundai-TV/COM. HSS100B/G (Pacific), HSS-100C (China) FTA. Different software versions; 2.26/2.27 good performers, 3.11 and those with Nokia tuners also good; later 5.0 not good. SATECH (V2.26)
Hyundai HSS700. FTA, PowerVu, SCPC/MCPC. Review SF March 1999. Kristal Electronics, 61-7-4788-8902.
Hyundai HSS800Cl. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. Int. 61-2-9618-5777
MediaStar D7.5. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777
MultiChoice (UEC) 660. Essentially same as Australian 660, not grey market contrary to reports. Sciteq tel 61-8-9306-3738
Nokia "d-box" (V1.7X). European, FTA, may only be German language, capable of Dr. Overflow software. Tricky to use.
Nokia 9200. When equipped with proper CAM, does Aurora, pay-TV services provided software has been "modified" with Dr Overflow or similar program was available from (www.BAKKERELECTRONICS.COM), now only from established users.
Nokia 9500/9600. Numerous versions for different world parts; not distributed in Pacific but assistance from Av-Comm Pty Ltd.
Pace DGT400. Originally Galaxy (Now Foxtel+Austar). Irdeto, some FTA with difficulty (Foxtel Australia 1300-360818)
Pace DVR500. Original DGT400 modified for NBC (PAS-2) affiliate use, with CAM equivalent to DGT400 but more reliable.
Pace "Worldbox" (DSR-620 in NZ). Non-DVB compliant NDS CA including Sky NZ, no FTA; similar "Zenith" version.
Panasat 520/630/635. MCPC FTA, Irdeto capable, forerunner UEC 642, 660. Out of production, spares fax ++27-31-593-370.
Panasonic TU-DS10. FTA + Irdeto CA; one of 2 IRDs approved by Optus for Aurora, but never available in Australia.
Phoenix 111, 222. PowVu capable, NTSC, graphics, ease of use. (111 review SF#57). SATECH(below)- 222 out of production
Phoenix 333. FTA SCPC, MCPC, analogue + dish mover. Detailed SF review Nov. 1998. SATECH 61-3-9553-3399.
Pioneer TS4. Mediaguard CA (no FTA), embedded Msym, FEC, only for Canal+Satellite (AntenneCal ++687-43.81.56)
PowerVu (D9223, 9225, 9234). Non-DVB compliant MPEG-2 unless loaded with software through ESPN Boot Loader (see below). Primarily sold for proprietary CA (NHK, GWN+ PAS-2 Ku, CMT etc). Scientific Atlanta 61-2-9452-3388.
Prosat 2102S. FTA SCPC/MCPC, NTSC/PAL, SCART + RCA. Sciteq 61-8-9306-3738.
SatCruiser DSR-101. FTA SCPC/MCPC, PowVu, NTSC/PAL. (Skyvision Australia 61-3-9888-7491, Telsat 64-6-356-3749)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - (Skyvision - see above).
STRONG Technologies SRT2620. SCPC, MCPC FTA, exc sensitivity, ease use, programming. Review March 2002 (# below).
Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. Strong Aust 61-3-8795-7990.
Strong 4800. SCPC, MCPC, embedded Irdeto+ CAM slots, Aurora, exc. vendor support. Strong Aust 61-3-8795-7990.
Strong 4890. SCPC, MCPC, 30Gb PVR, 2 CAM slots, DiSEqC 1.0, 1.2 (review SF#84); Strong Aust 61-3-9553-3393
UEC642. Designed for Aurora (Irdeto), approved by Optus; w/new software, C-band FTA; faulty P/S. Norsat 61-8-9451-8300.
UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel-limited FTA. (Nationwide - 61-7-3252-2947); P/S problems.
UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers.
Winersat DigiBox 200. C + Ku basic receiver but includes Teletext for NZ TVOne, 2 VBI. Satlink NZ, fx 64-9-814-9447.
Xanadu. DVB compliant special-priced receiver for members of SPACE Pacific (Av-comm Pty Ltd, tel +61-2-9939-4377)
Accessories:
Aurora smart cards. New v1.6 now available, 1.2 no longer available for RABS. Price now A\$105, Sciteq 61-8-9306-3738.
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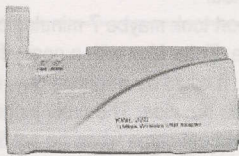
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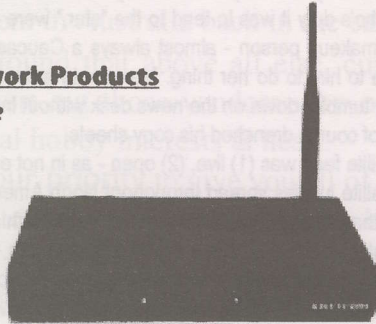
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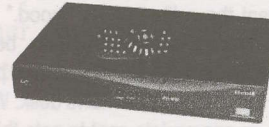
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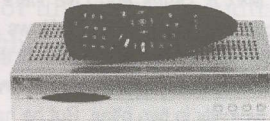
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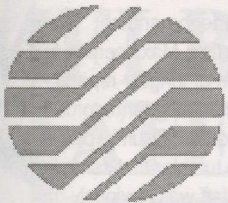
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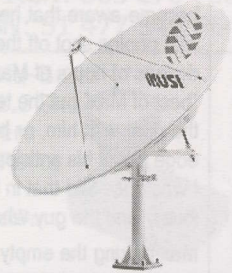
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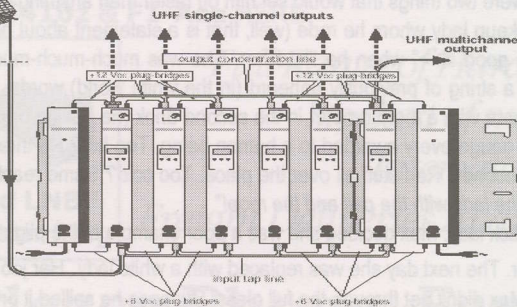
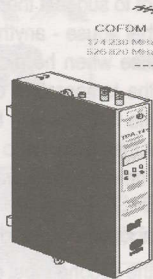
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TVRO History that you may enjoy

This is one of my favorite "early satellite days" stories. WNT (World News Tonight) was a new concept, multiple anchors spread throughout the USA (NYC, Wash DC and Chicago). ABC News thought they could build a bigger audience (in an era long before Peter Jennings) by spreading the anchors around and switching in the appropriate one "live" within the evening news. From Washington to NYC was cable. But Max was fed from Chicago live via satellite. So there, every night from 15 to 30 minutes before WNT through the second run, was a live studio shot from Chicago sitting on satellite (C-band). Usually it was boring stuff - guys and gals moving around the studio checking gear, someone "sitting in" for Max so the camera shots and angles could be rehearsed. And then - the grand entrance.

Max entered the set in a flurry of excitement. Well, a flurry of anticipation. To say he was a man subject to widely varying "moods" would be an understatement. The crew, especially those who's duty it was to tend to the "star," were obviously nervous - before he arrived, and until it was evident the calibre of his "mood." The makeup person - almost always a Caucasian lady in the early days - was the most nervous of all because she had to actually be close to him to do her thing. Max would arrive with a large glass tumbler filled with a red liquid in his hand. Some days he managed to put the tumbler down on the news desk without incident. Other days, he tipped it over setting it down sending liquid all over the news desk. Which of course drenched his copy sheets.

This would be an appropriate spot to note this satellite feed was (1) live, (2) open - as in not encrypted. For "The Max Hour" (which often ran to closer to two hours), a not small group of satellite junkies spread throughout North America became enamoured with watching the entire telecast. It was so famous for a period of time that a bar in South Carolina equipped with a satellite dish, posted on the marquee an announcement: "*Max R Drunk and Live Here Nightly at 5.30PM*". One drunk attracted lots of other drunks and in South Carolina in 1980-1981, the concept of a "black" TV News Anchor had not quite reached popularity. So you would find a bar packed with dozens of typically male white southern guys shouting at the TV screen each time Max did something awkward or "off colour".

The red liquid was tomato juice. But it was only red in color. It was mostly vodka. Max's Chicago based report took maybe 7 minutes out of the half hour - typically in two bites. But he had to sit there ready to be on-air for closer to 30 minutes, twice. Enter Max with a nearly full glass. He always found some human being to say something really nasty to as he approached his news desk. It could be a lighting guy, an audio gal or his favorite target - the white blond haired makeup lady. Who was cowering in fear usually off to the side. The crew judged how "their day" was going to proceed based upon the viciousness of his first verbal attack. The second judgement came when he set the glass down - *did it spill?*

I don't know which "union" she belonged to but this was perhaps the only TV newscast set in the world where a lady with a metal pail, a mop and a belt tucked full of clean up rags was a part of the regular crew. Her job was to "stand by" to clean up the news desk set area when - seldom if - Max knocked over the glass. Max of course had been drinking before he arrived on the set. Some days he would arrive only minutes (down to seconds) before he was due on the air. Those were the best days - he would be surrounded by people - one took off his street jacket and tried to adjust his tie. The floor director made an effort to introduce him to the news copy and give him a briefing ("*We go in at 5.40 and come out at 8.10 the first time ...*") while someone else speaking at (not to) him through the speaker connected talk back system was shouting about the film they would roll. Somehow in all of this the magic glass floated in his hand - from one hand to the other while the wardrobe lady tried to get his street jacket off and his on-air jacket on. Just on the edge of the camera view you could see the blond haired white lady who was challenged to put on his makeup as he sat down and the crowd dispersed.

Down in South Carolina and at hundreds of similar locations the guys were rolling on the floor in laughter - and ordering another "Max Robinson special, please!" And of course shouting things which today would be "politically incorrect" about Max. Over time Max seemed to become aware that he had a secondary audience. It was certainly no secret - my *Coop's Satellite Digest* did a couple of lengthy reports - with photos shot off the screen so everyone in the satellite biz knew the story. Not a few guys and gals using early Betamax gear recorded dozens of hours of Max for posterity and some of that tape is still floating around in carefully preserved versions. It would be difficult to pick a "best of Max" but the temperature of his tomato juice was extremely important. Whether he knocked over or spilled the tumbler that came in the door with him, or he simply consumed the whole glass (typically about half way through the first WNT feed) the staff was obviously on edge about his anticipated demand. He would consume the last drops and set the empty glass down. Now there was a mental count down. I was once told that in bars around the country people would start counting in unison. "One - two - three." A bar in California staged a daily lottery and the guy who picked the right number got free (bloody Mary) drinks for the rest of the night. The "right number" corresponded to Max picking the empty glass back up, looking at it with his piercing eyes and then holding it high above his head with a flourish. That was the end of the counting - when the empty glass went "high". It was also a hard signal to his "drink person" to rush to him with a new tumbler. Temperature. There were two things that would set him off faster than anything else (not to suggest there were only two). The first was the white blond haired makeup lady whom he rode (well, that is a statement about his verbal abuse - anything else was supposition) without mercy. She was a "no good sl>>" when he liked her. She was much-much-much worse when he did not like her. Max taught people all over North America a string of previously unheard (in the white world) words. And the temperature of his drink. I never found verification that someone sat there with a thermometer in the second drink (he having brought the first one with him) but his lips had to be the most accurate temperature gauge every awarded to a human being. Too hot? He threw it at the person who delivered it. No matter he was due back on WNT in ten seconds. Red stuff all over the place. Too cold? Same reaction. The drink lady was the usual target but not exclusively the only one. "*Cue the lady with the pail and the mop!*"

The pail lady was initially a black lady. Max decided she was a poor example of the plight of blacks one day and launched into a diatribe about blacks doing menial labor. The next day she was replaced with a white lady. Her job was the second most dangerous - right after the drink lady. Because, suppose Max didn't get through the full glass. Suppose he spilled it or knocked it over, or - as did happen with some regularity - got angry at someone on the set and used it as a missile? He was never - NEVER - apologetic about anything. He took some glee when he was able to actually hit the person he threw it at. So in the midst of this studio chaos, the pail lady and the drink lady had to be ever vigilant and ready to respond in a split second.

Under pain of something that would make death seem welcome. Max had not only the most vile tongue in broadcasting, he was hurtful. If a person had a limp, Max called them a demeaning name such as "Hob Leg". If a lady was wearing a tight sweater - well, she did that only one time. Meanwhile down in South Carolina they had a blackboard and some lucky fellow had the assigned task of writing down the new "Max Robinson words for today." The vodka industry had their best years when Max was on the air.

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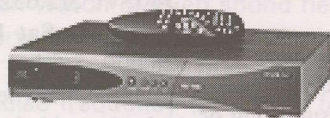
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WITH THE OBSERVERS

AT PRESS DEADLINE

Star TV 4000Hz, As3S, has rearranged FTA channels: 5-"726 Phoenix Info News," 7 - "743 Phoenix Chinese," 9 - "Xing Kong," 10 - "747 Channel [V]" (IF, Qld.) WorldNet As2's new 3880Hz MUX has had up to 5 diferent video services running in test, 28 radio counted (Sr20.400, 1/2). (D. Mitchell, NSW)

AsiaSat 2/100.5E: "Reuters TV (3775Hz, Sr 5.631, 3/4) bounces from CA to FTA, often several times per hour; APTN 3799Hz also doing same thing." (Tommy L., NT) "Changes in Saudi MUX 3660Hz (Sr27.500, 3/4) , Sahar Universal is new; also, 'Voice of Islamic Republic of Iran' is now APID 2434 (no video companion)." (Tommy L., NT).

AsiaSat 3S/105.5E: "Add to NOW-TV MUX 3760Hz, Sr26.000, 7/8 something called 'SPLASH TV' (V1030/A1031) now testing (kid's programming loop)." (NS, NSW) "Macau Satellite TV new on 3714Hz, Sr 5.868, 3/4." (Bill R, Aust). "Sahara TV no longer on 4182Vt analogue PAL; only 4020Vt, audio 6.8. Also, AsiaPlus now on 3640Hz analogue PAL, audio 5.5 and 6.2" (Dennis, Qld).

LM1/75E: "Super TV P4 analogue on my 4m, 3860Vt, audio 5.8 in PAL; TVM is now on 3987Vt, audio 5.5 SECAM." (David L., NSW).

Intelsat 701/180E: "Sr from 12.500 to 12.041 on 4086LHC RFO MUX." (Philippe) "On 11.610 MUX, add Tele-Caledonie." (Harvey, Fiji)

Optus B1/156E: "Imparja's 12.360Hz, Sr 5.424, 3/4 seems to have become more robust of late - signal is definitely up here on 90cm." (DM, NSW). "UK News at Ten is often fed via Mediasat 12.336Vt, Sr 30.000, 2/3 around 7.30AM Sydney time on MSAT Occasional channel (4 of late)." (IF, Qld). "New ABC Mux 12.606Hz, Sr 14.300, 3/4 with ABC Western, ABC Kids, ABC Fly and test card." (DM, NSW). "12.707Vt now has complex MUX that includes TV One and TV2, encrypted in Videoguard (was Irdeto); 12.734Vt has Saturn TV Mux Sr 22.500, 3/4 that really appears to be Sky NZ; both MUX were FTA for a period." (Craig S, NZ). "Astralinks V8 car racing for Ten Net, 12.420Vt, Sr 6.110, 3/4 V308/A256." (Bill R, Aust)

Optus B3/160E: "ABC on Austar is exactly the same service as ABC TV National on Aurora, including subtitles. This appears to be the only channel on Austar that has subtitling or teletext (the ABC has subtitles on page 801 as well as by calling up subtitles with the appropriate remote button). Additionally, the teletext pages one sees on display screens in a TAB from Sky (racing) can also be found on a UEC642 on the Sky Aurora channels during those odd times when the services are not encrypted - strange this teletext service works when the broadcasters don't work or work only on occasion with the same receiver." (AI, NSW)

Palapa C2M/113E: "As forecast, MTV Indonesia has now replaced MTV SE Asia 4120Hz, PAL, FTA." (Grant K, NT). "Correct channel line up (until they change it again!) for

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Saturday, May 25, 2002

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PUBLICITY could be dangerous. But ABC and NBC (including NBA basketball semi and final contests) 1701, 3769RHC, Sr 20.000, FEC 7/8 is a treasure.

4080Hz (Sr 28.125, 3/4) is: (1) Global TV - airing MTV (Indonesia), (2) Metro TV, (3) QUICK - which includes weak audio and some RAI material), (4) ANTV (ANteve, with audio glitch), (5) SWARE (with no audio)." (IF, Qld.)

PanAmSat PAS2/169E: "Reuters Singapore (feeds) 4045Vt, Sr 4.285, 3/4." (Bill R. Aust) "MUX with test cards noted 4165Vt, Sr 27.687, 7/8." (Bill R. Aust) "Tests on 3810Hz, Sr 13.240, 3/4 - V2160/A2120 and V2260/A2220, Belleville MCPC-2 and Globosat MCPC-2." (Bill R., Aust). "Sky News World Cup feeds 3796Vt, Sr 5.632, 2/3." (Bill R., Aust) "Unknown feeds 4027Hz, Sr 3.380, 3/4 - possibly religious services." (Bill R., Aust). "DACOM test card 3805Vt, Sr5.632, 3/4 V1110, A1211." (Bill R., Aust).

PanAmSat PAS8/166.5E: "Taiwan Bouquet 3860Hz, Sr 28.000, 5/6 has a number of unusual channels. 'Z' on 11, for example, has (nearly) 24 hour per day Japanese wrestling with subtitles added on screen for Taiwanese viewers. 5 and 6 are usually but not always test cards, 6 also airs 'GTS' which seems to be a Taiwan terrestrial channel. 'SET' (also on screen labelled SAN LIH International) on 8 is the only PAL format service (rest being NTSC). Channels that carry live action (such as soccer on 3) badly pixelate, obviously they have the compression cranked up so it cannot handle the fast action." (IF, Qld). "Taiwan Bouquet, 3860Hz, Sr 28.000, 5/6 - now 12 total channels starting with 01, as follows: 01 - TTV, 02 - CTV, 03 -CTS, 04 - Formosa/FTV, 05 - test card, 06 - test card, 07 - Sony Entertainment TV (not the same service currently on channel 1 Mediasat, 08 - SET - this is the only

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 July 15th issue: July 3 by mail or 5PM NZ July 5th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.

Western Australia Physicist uses moon to receive USA TV stations

This is one of those rare stories where an individual has done something so outrageous as to possibly earn him a spot in the record books. Dr. Anthony Mann of the Physics Department at the University of Western Australia has created a "receiving system" using mostly off the shelf hardware that allows him to "tune in" American UHF (band IV at this time) television stations from his near-Perth laboratory. "Tony" has been a long distance television reception enthusiast for several decades, using his professional credentials as a back drop to combining stretching the laws of physical limits with a passion to "see further and further, unaided by satellite or wire."

His latest accomplishment, apparently the first time it has been done in the world, is to carefully work out the parameters for using the earth's only natural satellite (the moon) as a "reflector" for bouncing TV band signals from the USA to WA.

Here is how it works. In the United States, Band IV and V (UHF) television stations are allowed to transmit with an effective radiated power of up to 5,000,000 watts (5 megawatts). For most stations this power is kept down close to the ground (the visual horizon from their transmitting antenna) but radiated in a complete (360 degree) circle. Thus in any singular direction radiating away from the TV transmitter, 6944 watts ends up in a tiny arc that is 1/2 of one degree in width. The moon approximates a "lump" in the sky of that width - an irregular curved, reflector surface. In 1946 a U.S. military installation pioneered transmitting radio signals to the moon and then hearing the echoes of this transmission a couple of seconds later. Ham (amateur) radio operators have advanced this technology and on any given day at any moment in time, there are probably several hams at widely scattered locations "conversing" via what is termed "moon bounce." Mann had done the paper calculations and worked out that if the conditions were "just right" some of that 5,000,000 watts of TV transmitter power radiating off into space just as the moon was setting from the vantage point of the TV transmitter might actually strike the moon and come back - to him. "Moon set" at the transmitter, with the moon "going down" just as it approached the distant western horizon, was essential. Why? Because the 5 megawatt TV stations keep their maximum signal down at their horizon - and as the moon slides down out of view at the TV station's horizon, maximum signal reaches the moon. And bounces off in a wide variety of directions.

The moon is anything but a perfect (smooth) sphere and jagged ridges, deep valleys and crater pot holes the size of Sydney abound. Only a small fraction of the actual signal reaching the moon ends up bouncing back towards earth.

Mann's receiving system begins with a Jaycar "91 element" deep fringe UHF antenna (model LT3182) which he calculates has 15 dB of gain at 500 MHz. This is retrofitted with a 2 dB noise figure GaAs-Fet, 20 dB gain masthead amplifier (originally sold as the JIM Model M-75 by Dick Smith Electronics). The receiver is an Icom R7000, operated in USB (upper sideband) mode. So far - nothing really special although the antenna is mounted 1.5m above ground on a tripod with a manual adjustment that allows him to adjust both the antenna's azimuth and elevation to "track" the moon in his sky. Fortunately, a moon setting in Oklahoma, for example, is well above the horizon in Perth.

Now the special stuff. As you might have guessed, the amount of signal Mann receives is tiny. Very tiny. Not enough to produce a picture he can watch or even sound he can listen to. At this stage the experiment is not about watching Bugs Bunny cartoons from a TV station in Muskogee, Oklahoma - it is slightly more scientific than that.

Knowing the transmitting station's precise frequency (to within a few hertz or cycles per second) are essential to his efforts. What Mann is doing is searching for a "beat note" (indication that a carrier signal is "there") with the Icom receiver. It is not a television set - it is a communications receiver. But even with only a few kilohertz of bandwidth (remember the TV signal itself is spread over 6 MHz), the signal is too weak to detect. So Mann has to connect the audio from the R7000 to a PC equipped with a very narrow band spectrum analyser. How narrow band? Try 2 hertz (not kilohertz) on for size!

Trying to "hold" the detected signal inside of his 2 hertz bandwidth is a significant challenge - especially when "Doppler shifty" is added. Doppler shift is a change in the received frequency, created by the rotation of the earth and the relative speed difference between the moon and the earth. By using web sites created by hams for their own "moon bounce" work, Mann had calculated the expected Doppler shift various stations would produce. Then he looked up using a USA web site the precise transmitting frequency for a group of likely TV stations (down to the nearest hertz - such as 501.248XXX - the 3 Xs are Doppler shift migrated). Using another web site he worked out the calculated Doppler shift and then adjusted his receiving equipment so that both the station's original frequency and the Doppler shift modification were accounted for. His results late in May included signals identified as originating at TV stations in Indiana, Oklahoma and Mississippi (all USA). Mann's results have been posted (spectrum analyser "grabs" of the signals received) at <http://www.physics.uwa.edu.au/~agm/eme1.jpg>. The most logical system improvement would be a larger receiving antenna - although bigger also means it will be harder to point and track the moon. There's something interesting happening here - worth keeping an eye on!

APOLOGY

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one in PAL, 09 - Tzu Chi (which is same as on Mediasat), 10 - Power TV, 11 - "Z" which is not related to "Zee", a totally 'weird' service, and 12 - not currently in use. Note all but one are NTSC." (IF, Qld - Ed's note: Our five year history is filled with attempts and shut downs of numerous Formosa/Taiwan packages. The odds are not good this one will sustain) "Unfortunately FOX News Edge feeds on 3940Hz Cal Bqt. Sr27.690, 7/8 has on screen advised they will be encrypted from 0600EST 31 May." (RA, Aust - Ed's note: Still FTA June 7). "Revised parameters for ABC A-P 4180Hz, Sr 27.500, 5/6 with V2307, A2308 (last 2 new)." (King, NT)

Thaicom 2/3/78.5E: "C7 (not Australia's sport channel) from Thailand seen on 3640Hz, Sr. 28.066, 3/4 V522/A650 FTA." (Bill R., Aust). "Cable TV promotions seen 3796Vt, Sr 5.000, 3/4 - seem to be from (Australia's) Sky TV. Moved here?" (David L, NSW - Ed's note: Not sure how this works with DD Punjab at 3800Vt). "Not satisfied to covet the TV services, TARBS has now made Egyptian radio services CA as well on 3640Hz." (Floyd, WA)

Soapbox: "When you compiled the 'Status of Smart Card Systems in Pacific Region (SF#93, p. 26) you seemed to have missed PAS-8, 12.686Hz, Sr28.126, 3/4. Jedi/TVB is Irdeto and I am assuming with no actual knowledge that Gold Cards can be or have been programmed for it. Currently the pay-per-view channel is 'suspended' but all of the other pay channels give the impression they are working (the EPG indicates this)." (Argo, Qld.) "When NASA started sending up astronauts they quickly discovered that ball-point pens would not work in zero or reduced gravity. To combat the problem NASA scientists spent a decade and a fortune in cash developing a pen that writes in zero gravity, upside down, underwater, on almost any surface and temperatures ranging from below freezing to over 300C. The Russians used a pencil." (IF, Qld.) "I recently purchased an 34cm NEC with teletext capability and my eMTech eM100 VBI (vertical Blanking Interval) teletext insertion (via the modulator) works well." (DM, NSW). "Rhythm FM, Aurora channel 68, a Sydney based radio station now rebroadcast at other Australian locations, has rebilled itself 'KISS FM'. It may be appropriate to the on-air demeanour of the service, but numerous pre-existing stations (such as a Lithgow, NSW commercial station) already use that on-air name." (AI, NSW) "Austar was holding 'Open Channel Week' first of June, allowing subscribers to access full line-up in hope they might upgrade to additional services." (Barry T.) "I notice www.dr7.com site, dedicated to digital news, is offering a new 'Enigmah X-Box Development chip' for US\$69. Device comes separate from 'card' and requires some careful soldering." (CS, Auckland) "ABC TV National moved to (Aurora) 12.532Vt and then again to Aurora channel 49 which is the 4th TV channel in use on this transponder (one up from SBS WA)." (IF, Qld).

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Sign-off

Last one out the door - "turn off the test card"

Australia's beleaguered pay television industry faces so many problems that it is no wonder high level participants are moved to colourful statements. Here are a few reported by the press since mid-May.

Rupert Murdoch: *"The whole history of pay-television in Australia has been a bit of a nightmare."*

Optus' Chris Anderson: *"No one in their right mind thinks that the pay TV business is a viable, sustainable business the way it is. The only real game is local telephony and, in the end, it is very hard to justify to (Optus owner) SingTel that it should keep paying out the \$350 million (a year) for a business going nowhere."*

Lachlan Murdoch speaking about a possible change in corporate structure at Foxtel where News Corp owns 25%, Packer 25% and Telstra 50%: *"News Corp would not want to do that. Both of our partners have been very supportive and very focused on trying to create some value out of what's basically a shit sandwich."*

The "smell" of defeat has never been stronger. At issue is whether Foxtel can obtain Australian Government (ACCC) approval for a planned business arrangement which would make it, rather than Optus, the primary distributor of movie, sport and general television programming for the Australian pay-TV industry. In favour of the plan are Foxtel, Optus and Austar - the three most likely to directly benefit. Against is everyone else - the free to air telecasters, the independent telephone firms, the newspapers. What the ACCC, in the person of Professor Allan Fels, must determine is whether by approving the planned Foxtel-Optus relationship the pay-TV business will be "more sustainable" (to quote Chris Anderson) or a continuation of the same "nightmare" (to quote Rupert Murdoch).

Optus is the first benefactor if the deal goes ahead. In their corporate dumbness years ago, Optus signed deals with TV programming channels (such as ESPN, Disney) and movie producers guaranteeing certain minimum payments for the TV products. If Optus had been a successful cable or satellite (or both) operator, the guarantees (typically amounting to 500,000 homes reached per channel) would have been self-dissolving. Money in - money out. But Optus was not successful, so it is paying twice for every home it does have connected.

When SingTel acquired controlling interest in Optus last September, it paid A\$13 billion for the firm. This rather large number was the sum of individual parts - satellites (B1, B3, C1 under construction), ground station support equipment, a mobile telephone business, and of course a fibre optic plus coaxial cable network which rolls past perhaps 2 million Australian homes.

Within the A\$13 billion price was A\$1.6 billion value assigned to the fibre + coaxial network. During May, SingTel revealed it was re-evaluating the \$13 billion "in light of current market conditions and expectations." Then it said the \$1.6 billion it paid for the fibre + coax network was being reduced

on SingTel books to A\$640 million. Gone at the crack of an accountant's pencil A\$960 million in SingTel corporate value; 7.39% of the original \$13 billion purchase price evaporated like a drop of water on a Singapore sidewalk.

It is a curious exercise in corporate management. SingTel obviously wants the ACCC to approve the proposed arrangement with Foxtel. In fact, through spokesperson Chris Anderson, the Singaporean bosses are relaying, "Look how easily we walk away from \$960 million. If this proposal does not go through, watch how fast we shut down the entire fibre network."

When you think about it, reducing the corporate book value for the fibre network by 60% in one accounting move is pretty severe. The fibre network has a fairly easily discernible replacement value (so many dollars per kilometre times the total number of kilometres installed - not exactly rocket science) and as SingTel owns and operates its own almost identical system in Singapore proper, one has to assume these guys were not novices evaluating the original Optus package when they purchased it. Therefore we have to assume the A\$1.6 billion original book value was more or less a correct one. Why would SingTel throw away (write off) 60 cents for each fibre system dollar invested?

Anderson has been widely quoted stating one possibility. "There is strong growth in the mobile telephony sector; why should we continue chasing a defective rainbow in the consumer and multimedia division?"

The heart of the deal ACCC must work through is a threat that Foxtel and/or Telstra would utilise their almost total control over Australian pay-TV programming content to force competitors out of business. It may be a spurious argument. Telstra already owns 95% of the Australian telephone connections. If you sum Foxtel's cable and satellite, Optus's cable and Austar's satellite and cable, all of whom would be reliant on Foxtel for programming if the deal is approved, it adds up to around 99.1% of all pay-TV in the country. TARBS, a handful of small local cable make up the balance. Is Foxtel or Telstra so stupid as to endanger the proposed deal by putting the screws on the 5% of telephone connections that are not their own, or the 0.9% of cable/satellite viewers? Unlikely.

The ACCC (Professor Fels and staff) may or they may not reach a decision on this matter by the end of June. The time frame is of their own making, and often in matters that are so highly political letting a situation drag on works to the benefit of the decision makers. What is likely is the deal will be approved but only with some complicated "special provisions" that have the intended effect of making Telstra a less avarice telephone company and Foxtel a more benevolent pay-TV provider. And Optus will be able to shift A\$600 million in debt from its books to Foxtel's books, greatly aiding its own financial position for at least the next three to five years.

For consumers of pay-TV the benefits are far less clear. Some Foxtel cable and satellite customers will elect to pay more money to add previously unavailable Optus movie and sport channels. And some Optus cable viewers will spend more money to access previously not-available Foxtel channels. But overall, there is no ribbon wrapped gift here for any consumer - simply the opportunity, if they can afford it, to buy more from the supplier.

All of this comes down to Lachlan Murdoch's "shit sandwich" analysis. In this case, if it smells like a cable system, and walks like a satellite system, it will probably taste like a bad investment.

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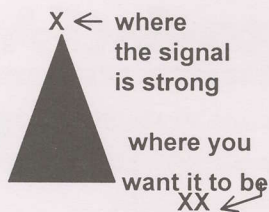
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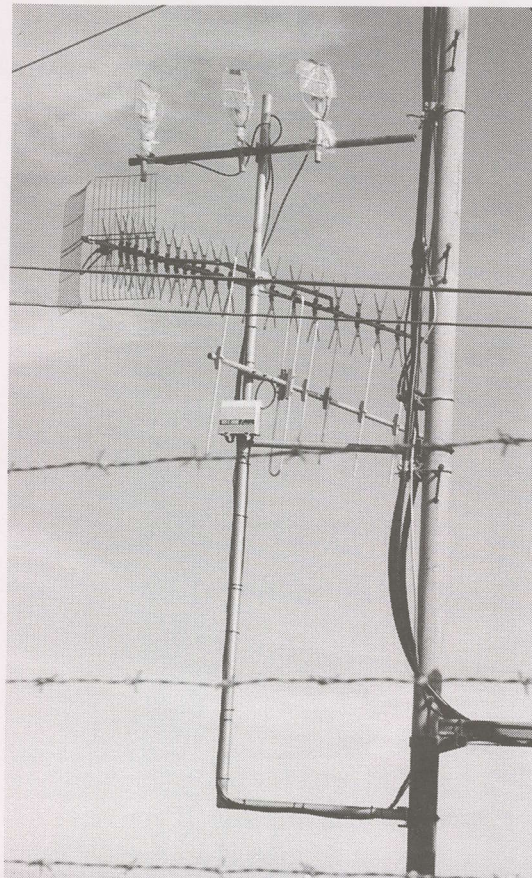


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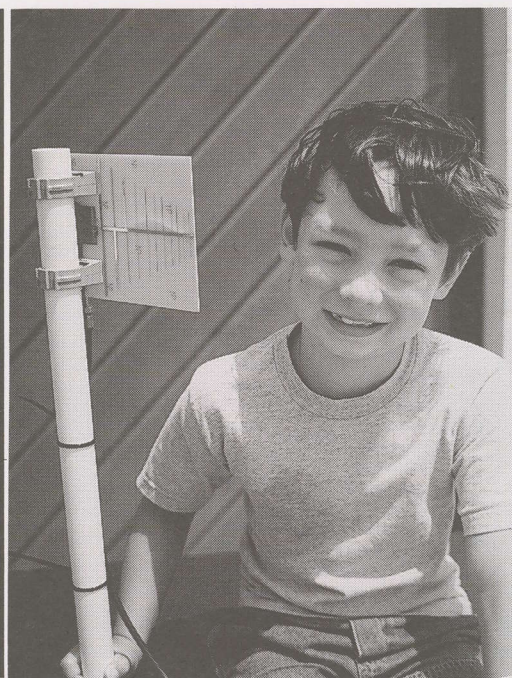
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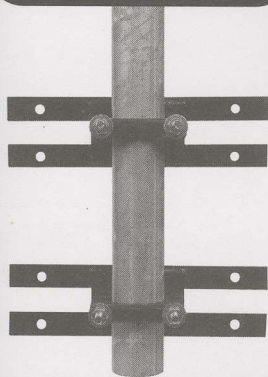
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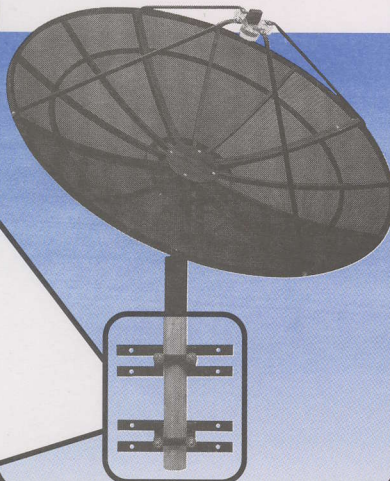
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