11-11-00 9AM

Bob Cooper's

November 15 2000

SatFACTS

MONTHLY

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

IN THIS ISSUE

UNUSUAL American DTH Products

FEEDS: Part 2 of more than you want to know

Distributor pricing, channel combining, terrestrial FTA

- √ Latest Programmer News
- √ Latest Hardware News
- √ Latest SPACE Pacific Reports
- √ Cable TV Connection

Vol. 7 ◆ No. 75

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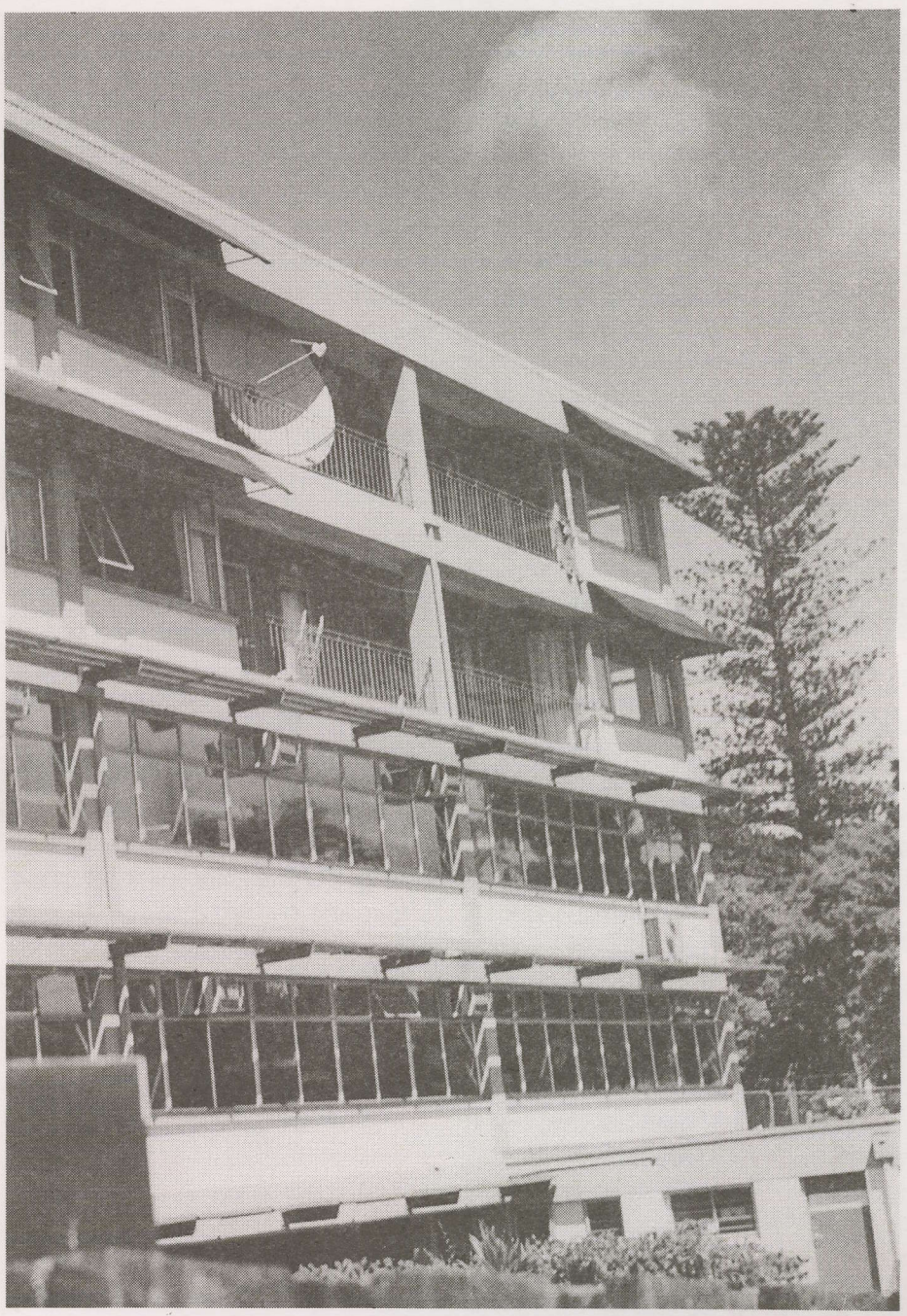

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(updated November 15, 2000)

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SPACE Pacific Report (# 9901, 9902, 9903, 9904)

The television programme, direct to you from digital master on E240 VHS tape, PAL format of course. Show 9901: "It is your signal, too" and "Fun and games with the spectrum analyser." Show 9902: "Feeds and LNBs" - understanding how products differ. And, "Mark Long's Thumbnail History of home satellite TV" featuring the real pioneers of the 70s and 80s! Show 9903: "Dish antenna critique ," why some dishes work better than others, plus Mark Long on installing your own dish, and, Richard Brooks on PVRs. Show 9904: "Who buys DTH systems?" explores the marketplace, plus, "Understanding Tiny Parts" looks at connectors, line-amps and splitters. Four hours as currently running on Mediasat - digital mastered to you for the exceptional price of $55 including shipping and bonus item - "Satellite Television (The Booklet)" featuring material by Sir Arthur C. Clarke. In stock, ypically shipped within 72 hours. (No SPACE discount)

Shows 9905, 9906, 9907, 9908 & 9909

The television programme - series two releases (as broadcast Sundays on Mediasat). As above. Show 9905: Robin Colquhoun and the Dr Overflow software for the Nokia; Show 9906: How the uplink works - possibly the best programme topic ever created. Show 9907: Part two of uplink. Show 9908: Instructor Mark Long's "Digital Basics." Shows 9905, 6, 7 & 8 **now being shipped**. $60, no SPACE discount.

TB 9402 MATV Systems

FTA terrestrial to multiple outlet sets. With DVB-T coming, this excellent step-by-step guide to proper master antenna system design and installation will prepare you for the far more complex world of distributing MPEG terrestrial digital signals around a home, multiple dwelling unit, motel or hotel. Basics of analogue distribution still apply - even with digital! Ltd Qty $10 (SPACE discount)

TB 9404 DTH Systems

Direct to Home: Satellite System Installation Techniques. There are many-many NEW people getting into home satellite system installation. And we receive several calls each day asking us to point them at a "basic tutorial" that will explain how a home dish system works, how you install it for proper performance. This is it. Without question, the very best *quick* tutorial on what a home dish system is, how it works, where the problems develop. If you are new to the DTH field, buy this and commit it to memory. Very slight New Zealand bias, not enough to hurt its value world-wide. And if you are looking into multi-set installations such as motels and hotels and condominiums, also order TB 9405 'SMATV Systems' (below; the pair make it painfully clear where mistakes are commonly made). Also see SatFACTS October, November, December 1999 - for RF Distribution System articles. TB9404 originally prepared by Coop for an Asian DTH technology conference, LtdQty $10 (SPACE discount).

TB 9405 SMATV Systems

Satellite to room - Commercial SMATV (Satellite) Dish Installations. The easy part is the satellite dish or dishes. The difficult challenge is getting all of those signals - including the terrestrials - balanced and into every room and each TV outlet at the proper level. If you plan to do multiple-outlet systems, start here with this Coop written tutorial. LtdQty and only $10 per copy while they last! (SPACE discount)

Nelson Parabolic Manual

The Nelson Parabolic TVRO Manual. If you are the type of person who wants to build your own dish (up to 3.7m in size), or, you simply want to understand why some dishes work better than others, this step-by-step "how to build a dish" manual is the "Bible" of an industry. Nelson Ethier was a perfectionist and brilliant with hand tools. It shows here - the ultimate backyard project! Half original price at $15, LtdQty, SPACE discount applies.

SPACE Pacific Order Form (also see SPECIAL PACKAGES on reverse side)

Please send the following:

☐ SPACE Pacific Report - 9901-9904/ $55 (no discount); ☐ Shows 9905-9908/ $60 (no discount); ☐ Package deal - 9901-9907 (**2 tapes**)/ $105 (no discount); ☐ TB9402 - MATV/$10; ☐TB 9404 - DTH Systems/$10; ☐ TB 9405 - SMATV Systems/$10; ☐ Nelson Parabolic TVRO Manual/$15. Total of order - $_____. If current SPACE member, multiply by 0.7 (70%) and write discounted total here: $_____

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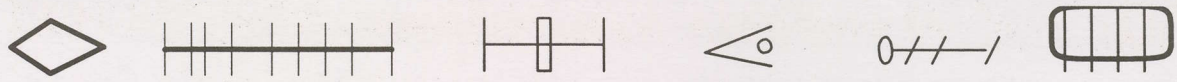
SPACE Pacific Terrestrial TV Reference Materials



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

TB 9301	**Tech Bulletin 9301**. *Co-Channel & Antenna Phasing*. How to grow a single antenna (Yagi, broadband antenna) into a complex array to greatly increase gain; sharpen receiving pattern to eliminate co (same) channel interference. Totally hands-on, very practical, up-to-date. Go from novice to professional!
TB 9302	**Tech Bulletin 9302**. *Weak Signal Reception Techniques.* If one cut-to-channel (Yagi) antenna won't do the job, will 2, 4 or 8??? How about 16? Stacking antennas, mating with carefully selected masthead amps, is an art. This explains how to do it for professional results up to 300 km from TV stations.
TB 9303	**Tech Bulletin 9303**. *UHF - The Frontier*. Using parabolic style antennas surfaced with low-cost poultry mesh, build UHF dishes up to 40 feet in size to extend UHF off-air reception out to 300 km. And - learn the tricks to "squirt" signals from a hilltop to a valley below using low-cost receiving equipment.
TB 9304	**Tech Bulletin 9304**. *Beating Noise Interference & Combining Cross-Pole Signals*. When TV and FM signals are weak, man-made interference from appliances, power lines can kill reception. Step-by-step instruction for identifying, locating, fixing noise sources + unique method of combining cross-pole TV signals.
TB 9305	**Tech Bulletin 9305**. *Cable Television - Fact & Fiction*. The story of how a cable TV system is designed, built, operated. The perfect "So this is how it works!" report. Who knows - you might even like the concept so well you take out a mortgage on your home and wire your town!
Lost Art	**Lost Art of Rhombic Antennas** *-27 dB of gain VHF & UHF*. Everything you need to know to build the most sensitive VHF-UHF receiving antenna ever created. Rhombics are used for virtually all long haul military circuits. Includes super-Rhombic LaPorte design. 300 km? A piece of cake!
40' Dishes	**20 to 40' Poultry Mesh (Chicken Wire) Parabolics**. Complete instructions to build UHF-TV off-air reception antenna system combines low cost reflector materials with Redwood or other durable "struts." 20 to 25 dB of gain, out to 300 km UHF reception. A backyard project with earnings potential.
Half-Bolics	**World-Famous Frias Half-Bolic Reflector**. Amazing design allows simultaneous reception over sizeable arc of transmission locations. City grade (80 dBuV) reception from distances of 280 km on VHF (45 MHz) through UHF (900 MHz). This is huge, but easily the best all-around deep-deep fringe antenna system.
NOTE!	**NEW to ABA Terrestrial TV Blackspots?** Order TB9301/9302/9303/9304/9305 "Special Package" below ($40) to quick cram ALL of the problems associated with "ABA Proof" of Blackspots!

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☐ TB9301/9302/9303/9304/9305 - $40 -or- ☐ Rhombic/ 20-40' Dishes/ Half Bolics - $50 -or-

☐ TB9301/9302/9303/9304/9305 + Rhombic/20-40' Dishes/Half Bolics - $80.

Total of order - $_____; If current SPACE member, multiply total by 0.7 to obtain discount price (NOTE: No discount applies SPACE Pacific Report video) - new discount total $_____ . I wish to pay this by ☐ Cheque (enclosed) ☐ VISA ☐ Mastercard

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This publication is dedicated to the premise that as we are entering the 21st century, ancient 20th century notions concerning borders and boundaries no long define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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ERRATA

COOP'S COMMENT

November 15, 2000

Our August (p. 6, "This is what we want") and September (p. 6, "Who can you trust?") reports drew from dialogue generated during the SPRSCS 2000 sessions at the end of June in Melbourne. Both have attracted a reasonable amount of feedback and we share some of these comments with you here.

"*I have tried to engage* (two well known) *distributors in conversation about these two reports in SatFACTS; neither wanted to discuss the problems mentioned. Are they hiding their heads in the sand hoping something will change?*"

Peter Lacey (Lacey's Australia) has a response as follows:

"*Distributors are notoriously quiet* on these subjects and I am sticking my head out by saying anything at all; let us hope I don't get it chopped off!

"*The problems outlined in SatFACTS* and experienced by us almost daily seem to come back to one common denominator. We are operating in a small market that has unreasonably high competitive forces at work. The large number of UEC boxes installed might be big business for UEC, but no-one else. One TVRO installer/dealer who for 12 months has been asking how much is this and how much is that but has bought almost nothing from us has a string of stories about the unbelievably good buys he has made. Interwoven with the 'good buys' he has a second string of stories about how upset he was when he asks a supplier for support for a set-top box and was told, '*the* (small) *amount of gear you purchase from us makes it difficult to provide the level of support you ask for.*'

"*Looking at the Aurora market*, neither importers or distributors can make more than the most slender of profit margins on set-top boxes, LNBs or dishes. The going rate for the supply and install of the Aurora package which costs the installer AU$850 has been AU$1500 and up. Great for the installer, but now there are reports of pay-TV installers doing Aurora installs for $1,100 all up! Where does it stop???

"*All of this makes it tough* for the distributor. How can distributors provide service and a low price? It just doesn't work!"

The installer is typically a one man operation operating from home. His major expense is his vehicle. The distributor has a rented or leased facility that includes warehouse space. The distributor has to stock equipment in depth, the installer only buys a system when he has a sale and typically carries very little stock. The distributor has a staff (the people you go to seeking assistance and backup support) and multiple vehicles. The installer collects a check when the installation is completed, the distributor extends credit terms to worthy accounts - and requires a suitable bookkeeping system and staff to support the granting of credit. The installer picks up the equipment from the distributor's warehouse or has it shipped to his door by courier. The distributor has to deal with supply sources outside of Australia or New Zealand, probably has to attend trade shows in places like Singapore, Hong Kong and Taiwan to locate the original parts. Then he has to arrange purchase terms, ship very large amounts of money off shore to get the purchase released, battle with customs and airline staffs to get the gear into his warehouse, and typically discover a percentage of what he was shipped won't work when they get there! For this the distributor *hopes* to make a 25% "profit" on landed costs while installers routinely add more than 25% for a few hours labour.

-ON THE COVER-

Auckland *"solution"* to no rooftop antenna rule; top floor, balcony mounted C-band dish assembled on the spot by sheer good luck ends up pointed at AsiaSat 2. No, shielded top and iron grate along lower half of dish will not improve the performance! Photo by Laurie Mathews, Mathews Electronics; dish in suburb of Parnell near St Stephens.

LETTERS

And - digital's pluses

"I totally agree with the letter in SF October regarding the advantages to the present level of digital television. You point out that only if digital from studio to consumer television is it 'true digital'. I agree with you, but in the real world of consumer television reception, most if not all reception in the region of Northland (NZ) I deal in comes in two categories: (1) OKish but hardly brilliant, and, (2) 'crap'. I have a contract to install Sky (NZ) digital service and have been installing VHF aerials for FTA terrestrial for many years. When a customer, who has for years had 'crap' VHF television reception sees their first digital, the eyes get rather large and their jaws drop to the floor. They can't believe all of the terrestrial reception noise (snow) and interference is gone, and moreover, that I can hook their Sky digital sound to their stereo system! Not one person has failed to be impressed with digital. So on the ground, in the real world, the average consumer is obviously benefiting from the 'quasi-digital' presently available. Finally, October SF was the best in a long time - the article on feeds is great!!!"

Paul Burton, Waipu Television, Waipu, NZ

All we are pointing out is a need for improved honesty by the programmers. And set makers. Is digital Sky NZ better than local terrestrial reception? Of course. Is it "true digital" as advertised? Not yet. How many consumers would be pleased to learn they will at some future date be required to replace their present TV set with a 'digital ready' model because their pay-TV provider is upgrading to a digital throughput IRD?

Scalar rings from plastic

"Read with interest your article (SF October) on feeds. You missed an updating footnote as some feed suppliers offer scalar rings made out of moulded plastic. How would these effect the performance of the feeds tested in your report?"

Morris, Bangkok, Thailand

lastic does not *conduct* microwaves; it may "bend" e waves slightly, as the October report suggests erence plastic waveguide feed covers. But it in no way does what a metal scalar will do - broaden the 'footprint' of the feed to better cover the outer edges of the dish. We have seen some that use a metallic pigment, others that dip the plastic scalar attachments with a metallic paint. However, until we have the opportunity to test such variations of the all metal scalar, we have to be conservative and suggest they are a do-nothing copy of the original product.

Is it just me?

"GWN through Optus Aurora is like watching The Fashion Channel on As2 on my system; the rest of the Aurora TV channels are fine. This made Olympics viewing very tough. Is it just me?"

PH, Australia

PROGRAMMER PROGRAMMING PROMOTION UPDATE

NOVEMBER 15, 2000

THT/NTV farewell. Fax communiqué from Stefan Kollar (Sales Director, Intersputnik) advises, "It was a decision of NTV and its affiliate THT to leave LMI-AP1 and this is completely beyond our control. We are sorry to inform that currently Intersputnik does not plan any TV services to Australia (and the Pacific)." As for Russian services from Yamal 101 (75E), "this satellite is not ours - it belongs to Gazcom (email tv@gazcom.net.ru) and you should contact them for technical details."

Comet. For their latest *trick*, they have signed a contract with Rupert Murdoch's BSkyB to provide 450 installers in regional England. Meanwhile in Australia contractors report, "*Morale is at an all-time low. Management seems to have developed a 'them' and 'us' attitude and 'them' are the installation personnel.*" A much repeated story tells of four Western Australian installers who were "invited" to pack their bags to fly to NSW "*to help out*" with a "*temporary work overload.*" Comet was paying for the trip which perhaps should have been a red flag. When the four arrived, they discovered they had been brought in as "strike breakers" in a management power play to get locals to return to work on Comet terms. Latest concession - $3 more per install to be paid in Victoria, but not until "*perhaps* December." At risk - that as Australian DVB-T takes off, installers will jump to terrestrial installs creating an even greater shortage of qualified, skilled, *satellite* installers. Eighteen months ago SatFACTS in corresponding with Comet head Kingsley Mundey invited him to "sit for an interview" and he agreed. We sent a list of questions in advance of the scheduled interview and never heard from him again. Perhaps he didn't like our questions??? Oh yes - if *you* are offered an opportunity to fly to the UK for install work there, *ask questions first*!

Those daring Canadians. Hey, if you are the size of Australia and have about the same population, how do you get attention when you live next door to the world's most powerful country? Try http://www.nakednews.com. Four ladies do a total nude-newscast. A serious newscast including weather and sports. Best line we heard? "*We have a predominantly male audience and believe most of them are naked when watching us.*"

Indian authorities have finally released "rules" for (Ku-band) DTH for that region. Foreign firms are limited in ownership (20%) and control (49%) and incentives are in place for uplinking through an Indian satellite (InSat) from Indian soil. Now the fun begins.

TeleKom 1 and HBO. Unexplained reports that Indonesian communications (not television) satellite at 108E has switched its "video test signal" from CNBC to of all things HBO Asia (3580Hz, Sr 20.000, 3/4 - VPID 32, APID 33). Occasional PAL feeds also appear from time to time on 4000Hz.

Pace DGT 400 updates. Foxtel has done over the air upgrade of older style IRDs to make the menus more like the UEC 700/720 series displays. UEC 720 is now stock item for Foxtel, almost identical to 700 but has modified clock function.

MacStar mystery claims it all. Receiver promoted on Internet claims in-built ability to process both Irdeto and NDS with appropriate official cards of course - latter used by Star Asia, Sky NZ, BSkyB UK. IRD appears to be Chinese in origin, claims NTSC to PAL conversions, advanced DiSEqC to handle up to 8 satellite/feeds, Sr 2-45, PID edit. Also promised - "Recorder-Decoder" with built-in 15 Gb hard drive using 'EMMA' single chip solution created by NEC. Importer is in Victoria.

EP 319 Television Signal Analyser

Dual spectrum markers with frequency and level differences displayed
Electronically generated graticule makes the EP-319 easier to read
Huge range of measurements and features included as standard
Digital Signal Quality measurement options available

EP 319 is a no compromise maintenance and troubleshooting tool for system engineers and installers involved in analogue and digital worlds.

Level and Spectrum measurements feature high accuracy and selectable Resolution Bandwidths of 100kHz, 1.5MHz and 4MHz to provide the best real time spectrum displays of signals from TV stereo audio and colour sub-carriers to SCPC satellite signals. Return path measurements are possible thanks to 5-40MHz sub-band. Data logging of both analogue and digital signals over long periods of time is also provided. Average digital channel power over a user selected bandwidth is automatically measured.

EP 319 supports Unaohm service quality measurements of QPSK+QAM or QPSK+OFDM Digital TV signal options. From Bit Error Rate, Modulation Error Rate and Reed Solomon Uncorrected measurements, the installer can quickly determine the integrity of QPSK+QAM or QPSK+OFDM signals. As checking digital service picture and sound does not tell the installer how close to failure the signal quality is, these measurements are important.

Operational running time has been extended beyond 1 hour thanks to a long lasting and compact Ni MH battery pack, included at no extra cost. The battery compartment can be accessed from the outside at the swing of a lid, with no need to open the analyser case.

Features that complete the EP 319 include Dual Spectrum Markers with Frequency and Level difference (delta) measures, an electronically generated graticule, On Screen Display function indicator, automatic analogue Carrier to Noise and Vision to Audio ratio measures, internal 13-15-18V 500mA capacity LNB or masthead amplifier power, DiSEqC 2.0 switching, Teletext, SCART AV socket, RS232 for a printer modem or PC, and a 4&1/2" black & white CRT. Options include an internal Noise Generator test source, MPEG2 transport stream output for BER equipped models, 2230MHz frequency range extension, external Fast Charge kit where continuous in field use of EP 319 is required, 50Ω input impedance and Nicam.

The unit is rugged, portable and can be used fully independently without additional subscriber equipment.

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Rupert's system

"Returning from extended visit to UK and thought you would be interested in how BSkyB works in practice as I tested it myself. At 9AM called a firm of installers and by 2PM the same day the dish and Digibox were installed and working. I had specified the new Sony Digibox and that is what I got. The cost? Forty pounds (an extra 60 pounds if no subscription is taken). The cost for the 'Basic' package is 7 pounds per month, twelve pounds if you take everything but current movies and sport. The Digibox becomes your own after 12 months without conditions. However, only one Digibox per household is allowed which means a flat with five tenants can have 5 separate Digiboxes. And after 12 months sold on the open market for substantially more than 40 pounds, in mainland Europe. There is a large market for these there as there are FTA services on Astra 28E and also free viewing cards available to any UK resident which can be sold on. The sad result is the FTA satellite market is very much diminished and the niche market is mainly for those interested in porno and foreign language. With almost 200 channels covering every conceivable interest available through the Digibox, this is hardly surprising!"

SG, Asia

SMPS - again

"Reference SF September p. 32. The common garden variety switch mode supplies used are the result of the varying supply voltages still experienced world-wide and answer the real problems associated with AC mains voltages that range from 90 to 240. The suggested use of desktop computer supplies that seem 'chap' are actually selling with distribution mark-up absolutely minimised. The SMPS supplies in any run over 10,000 will always be substantially less than computer supplies, at the OEM level. A replacement supply for PCs typically costs AU$100. And not all of that noise you find may be coming from the SMPS; the CPUs inside the IRD are also known generators of RF interference. I personally feel noise from the SMPS can be cured with better shielding and ferrite bead line filters."

Peter Lacey, Lacey's Australia

Realistically, we are not going to return to linear supplies - SMPS will rule until something better (read "cheaper") comes along. Manufacturers who hide behind "We meet all (standards) requirements" are missing the plot. Any receiver that generates interference which impairs the reception of radio or TV signals may be satisfying a poorly written set of technical specs adopted before SMPS came onto the scene, but by screwing up people's radio and TV reception, they are polluting the spectrum. We don't stand for cars that pollute or factories that send miles of toxic smoke into the atmosphere - why should be accept receivers that do the same to the airwaves?

DVB-T boxes delayed?

"Is it true that Australia is unlikely to have set-top DVB-T boxes in time for January 1 launch?"

Marian Schowers, Sydney

True. The unique-to-Australia 7 MHz wide VHF and UHF channelling requires a special tuner. As of November 10, only small quantity samples were available from tuner creators such as Alps; see p. 20 here.

HARDWARE EQUIPMENT PARTS UPDATE

NOVEMBER 15, 2000

IHUG's technical problems. New Zealand's "second largest Internet provider's" satellite record, using PAS-2 Ku, receives high grade ratings from most users but their iDTV terrestrial service continues to be troublesome. Take the *Jet Inn Hotel* in Auckland, the very first commercial facility to be wired for in-room service. They receive the iDTV 12 GHz service from one of two Auckland area transmitters (originally Sky Tower, more recently Waiatarua Hills). It seems cell phone sites in the area do an automatic data dump as frequently as six minute intervals, polling all phones within their geographic coverage and asking, "Are you there?" The Telemann Skymedia 2000 software used by IHUG cannot handle the 900 MHz high powered telephone energy. When Auckland's second site at Waiatarua activated, the Jet Inn terrestrial dish was repointed hoping to get around the interference. Alas, even when the dish end RG6 is *disconnected* at the LNB, the cell signal is overpowering and still locks the receiver. The Jet Inn has given up trying to keep the system operating; now, when it locks they ignore the problem until a guest calls to complain. Then they "fix it" by powering off the receiver and resetting everything to zero. Technically, cell sites operate +/- 900 MHz, close enough to L-band IF range (950 - 1450 MHz) to simply overload the receiver. L-band receivers are not known for their rejection of out of band signals but if you are having similar problems, you might *try* substituting an LNBf with a higher L-band IF range - such as 1650 - 2150 MHz - provided the receiver software can handle a higher IF (the Telemann allows L-bands of 950 - 2150). That would move you 750 MHz upward from the 900 MHz cell phone site frequencies, which could be a winner. IHUG feedback reports, "*We had real troubles with our terrestrial service operating on 12.266 GHz, and a local oscillator of 11.300 - ending up on 966 L-band. We now use a 10.75 LO (1516 L-band) or 11.0 LO (1266 L-band) and this seems to have fixed the problem .*" Perhaps, but apparently not at the Jet Inn.

SpaceNet 4 at 172E. Here's the story. A new consortium, made up of GE Americom and partners, is building an around the world satellite system to compete with PanAmSat / Hughes using Alcatel birds. They have acquired the satellite assets for the TDRS and Loral lines, plan a series of new high power C + Ku band birds by 2003. But initially, their transpacific connectivity was poor. Enter SpaceNet 4, formerly at 101W but recently replaced by a newer bird. The SpaceNet 4 has now been moved to 172E, has linear Vt and Hz polarity (12 x 36 MHz on Vt, 6 x 72 MHz on Hz). However, the transmit pattern, as an ex-North America bird, *is all to the north*. Boresight (35 dBw) is near Hawaii while 30 dBw extends from Taiwan east to San Francisco. South of the equator we are either in the low to mid 20s or worse. So until the new superpower super-bandwidth birds show up in 2003, hang tight. Some readers south of the equator will be lucky because this bird has "puddles" of unintended coverage to the south - typically quite small and unstable in operation.

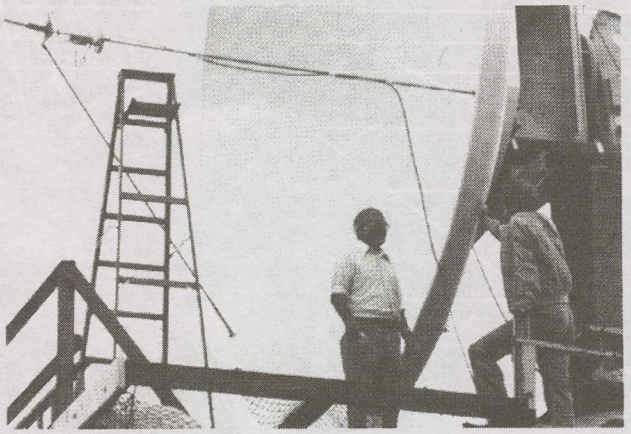
DVB-T set-tops. Australian networks 7, 9 and 10 have formed a "buying group" to encourage manufacturers to provide DVB-T set-top boxes in time for the January 1 launch of digital TV. Problems. 7 MHz channel-width tuners remain available only in "sample" (not production) quantity from any source and without tuners, no boxes. Pricing. Target price of Au$500 is realistic but not for box that does anything but process simplistic SDTV signals without "attachments." Bottom line - Australian digital terrestrial will have very few viewers until mid 2001.

AsiaSat 5 will collocate with AsiaSat 3S (105.5E) when launched in 2002, add capacity down to 3.4GHz and new Ku-band transponders not on As3S.

Antenna feeds: In our October part-one report, we investigated why any object which impedes the orderly flow of microwave frequency energy from the reflective dish surface to the "probe" antenna creates obstacles (blocks the flow of energy), or, impedance mismatches (reduces the efficiency of the microwave energy transfer from reflector to LNB).

In this part two report, we look at how the probe actually works, and what ingenuity was created to allow the probe to "rotate" or move in response to viewer command when switching from a vertical to horizontal signal (or vice versa).

TESTING TVRO FEEDS PART TWO



AS THE Probe Turns (*)

When **CSD** set out to carry a group of industry feeds to the San Diego test range of Microwave Specialty Corporation in mid-October, we were not aware that the world of feeds was about to explode. We had been aware, in some detail, of charges and counter charges levied by Chaparral, Boman and Antenna Technology Corporation over the history of the rotating probe system we now all use so widely to make our switching from vertical to horizontal 'play.' Each claimed the other was a 'pirate', engaging in various levels of industrial espionage to carve out a market position. While such claims are not to be totally dismissed, nothing much seemed to be happening in that arena and other than a brief court appearence of Chaparral and Boman in the fall of 1982 (something neither side wishes to discuss, which suggests there were no real winners), the marketplace seemed to be rocking along pretty solidly.

That was before Chaparral obtained a patent on their rotating probe system. November 8th was the date, to be precise, and since that time there has been no end of legal trickery, an endless stream of press releases, and a long list of telephone calls and an aura of mystery surrounding the patent and its effects on the TVRO feed marketplace.

The obvious first. Chaparral has a patent on a rotating probe **(Patent number 4,414,516).** That patent was granted on November 8th. That's the end of the obvious, uncontested facts.

Immediately parallel to the granting of that patent, perhaps even prior to that patent actually being in the hands of Chaparral, a series of press releases were mailed to most of the publications in the industry, and to most of the large scale buyers of feeds (antenna OEMs, distributors, and so on). The Chaparral press release charged that it, **"... a leading manufacturer of components for Satellite Communication Systems,** (has) **filed a complaint for patent infringement, trademark infringement, false designation of origin and unfair business practices against Boman Industries of California".**

The effect of the press release, and the mass mailing of copies of the complaint allegedly filed against Boman "... were devastating" according to Boman's Robert Maniachi. "What is worse, we went to the Los Angeles court to find a copy of the complaint. We had not been served, and the only information we had was from the many journalists calling to ask our response". That was the 8th of November. It would turn out, according to Boman, that more than three weeks would elapse before any papers were delivered to Boman officially 'summonsing' the firm to the charges. Even then, as November turned to December and no **papers** had been served on Boman, the actual delivery of the charges (formal service is required in California) was handled in what Boman characterizes as a "... most strange manner". The papers came by messenger, were "simply dropped at the reception desk with no effort to serve them on an officer of the corporation, nor to obtain a signature as proof of service".

So while Chaparral was papering the TVRO industry with copies of the press release and complaint allegedly filed against Boman, Boman was at something of a dis-advantage. They had no direct knowledge of the charges. We'll return to all of this.

TAYLOR Howard's Patent

CSD had been 'forewarned' about the pending grant of a patent, and the 'threat' **of** a lawsuit against Boman during the SPACE gathering in Orlando. At that time **Taylor Howard** told us that the long sought patent would finally be granted on the 8th of November (it was) and that Chaparral would immediately bring suit against Boman for infringing on the patent.

In as much as **CSD** was at that time researching the history of feeds, and we had some recently gained knowledge of feed patents, we asked Taylor to explain what his patent covered. We'll use some diagrams to explain why the Chaparral feed ended up getting a patent.

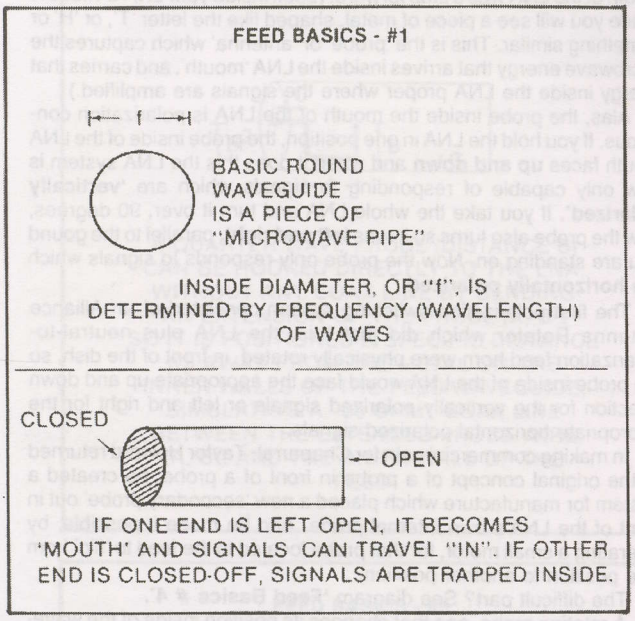
See **'Feed Basics # 1 here'.**

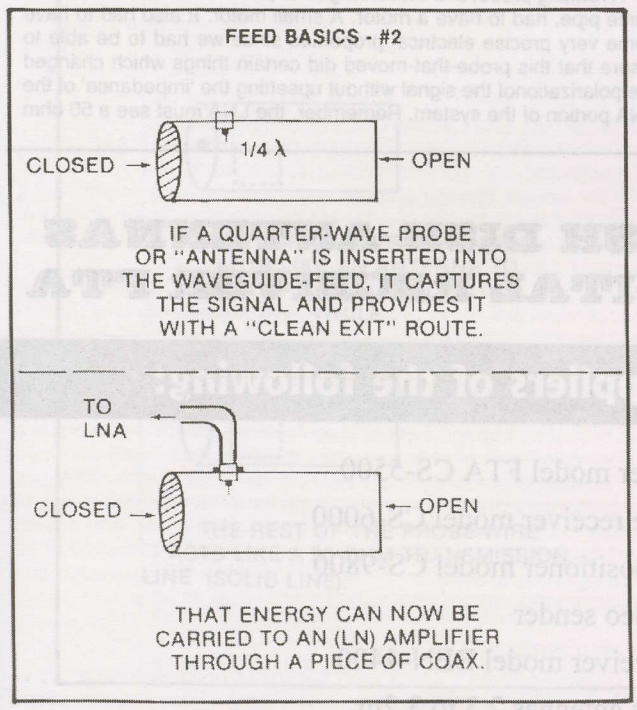
A feed is actually nothing more nor less than an open piece of microwave waveguide; and a waveguide is nothing more nor less than a 'pipe' of the appropriate size to allow microwave signals of a particular frequency (band) to flow through the pipe. Waveguide varies, in physical size, as a function of the wavelengths of the signals to be transported by the 'pipe'. Generally speaking, lower frequency microwave signals, with a longer wavelength, require 'bigger' pipe. Higher frequency microwave signals, with shorter wavelengths, require a

*With credit to Mike Pelzman of Boman Industries for the subtitle.

Patents: Creativity is rewarded by the issuance of a patent which has the effect of declaring who the inventor is, and serves as a legal warning to all others that "copying" the technology revealed in the patent is a violation of law. Patent applications depend upon the integrity of the creator to make true statements which upon investigation by the patent office are as a bare minimum found not to be in obvious error or in conflict with previously issued patents.

'smaller' pipe. You can probably envision how a 'too long' wavelength would not 'fit' into a piece of waveguide 'pipe' that is too big. You should also understand that when the pipe is too large (ie. designed for shorter wavelengths, operating at a higher frequency) the results are also bad. Using 4 GHz frequency waveguide at 12 GHz causes something known as 'multi-moding': you get the shorter waves bouncing around in an oversized pipe and they cause interference with one





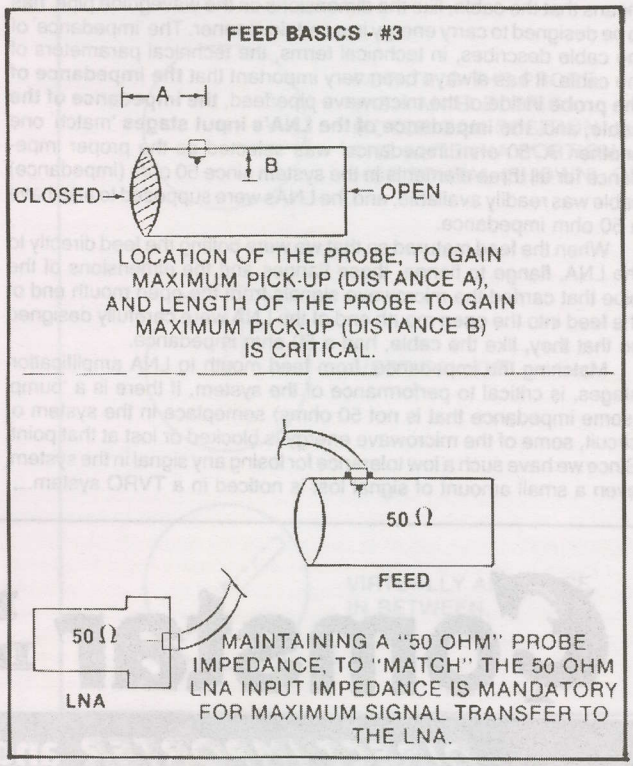
another. The important thing to understand is that you must use the right dimension pipe for each frequency or wavelength. Too big pipe is bad; too small pipe is not good either.

Now if we take a piece of 'waveguide pipe' and we leave one end open so the microwave signals can find their way in, but we close the opposite end of the pipe, we have a 'trap' for microwave signals. They can go in through the open end but they don't pass through because of the closed end. Again, see 'Feed Basics # 1'.

Now how do we get the microwave signals into the open-one-end/closed-other-end pipe? Simple enough. We place the pipe at the 'focal point' of the dish and we point the open end at the center of the dish. And we call this new piece of equipment **a feed.** It functions like a catcher's mit. If the microwave signals are 'thrown' directly at the 'catcher's mit' they plop into the pocket on the mit and lodge inside the pocket.

Check out **'Feed Basics # 2'.**

With the signals inside the feed pipe, now the next trick is to get them out in a controlled way. If we simply closed one end and left the other end open, and positioned the pipe as a feed at the focal point of the dish, the microwaves would reflect from the dish surface into the open mouth of the microwave pipe and come into contact with the solid, closed end. Since microwave signals bounce from something solid (witness the antenna's reflector surface), you can see that the signals would strike the rear, closed end of the feed and bounce right out of the feed back towards the reflector surface. We want to divert them, now they have found their way into the microwave pipe, and



having broken the bounce-bounce 'cycle', transport the microwave signals into our LNA.

We do this by placing a small 'antenna' inside the pipe. Some people call it a 'probe' but what it really looks like is a miniature '1/4th wave antenna' sticking into the inside of the microwave pipe. Picture those short 'whip' antennas stuck on police cars or taxis and you have the idea; a straight piece of wire or metallic material inserted into the microwave pipe.

If the probe/antenna is positioned in the optimum spot inside of the pipe, it collects most of the signal bouncing into the pipe. The probe/antenna acts like a 'sponge' soaking up the signal present. It acts in this way because the microwave signals are like the boll weavil; they are looking for a 'comfortable home' and to their electrical energy that little probe is the most appealing thing they have 'seen' since they left the companion probe back on the uplink transmitting antenna some 45,000 or so miles ago!

So now by careful design of the probe, and careful placement of the probe inside of the microwave pipe, we have the 4 GHz signal energy ('microwaves') 'flowing' onto the probe. On the opposite side of the probe, outside of the waveguide pipe, we connect a piece of cable or wire to 'transmit' the microwaves from the probe to our LNA.

LNA versus LNB. At the time of this report, low noise amplifiers (without the integrated block down converter) were the "state of technology." Subsequently, LNBs arrived and finally the LNBf where the low noise amplifier (**LN**) + the block down converter (**B**) + the feed (**f**) system were combined into a single unit. This did not change the patent situation for the feed portion as long as the **LNBf** employed the same feed technology as the original separate feed devices.

Probe rotation: Something that "moves" inside of the waveguide was an invitation to disaster. Imagine having a giant spider at the back of the waveguide, coated with metallic paint, and jumping around!

Look at **'Feed Basics # 3'.**

If the precise location of the probe, within the microwave pipe, is critical to the performance of the 'feed', so too is the way the probe connects to the LNA via the 'cable'.

The very first feeds stood alone from the LNA; they did not bolt directly to the LNA at all. The feed (piece of waveguide pipe plus probe) was mounted at the focal point while the LNA was mounted some short distance away. This was before it was discovered that the waveguide pipe fittings on the LNA and the feed could be directly 'bolted together' by eliminating the probe inside of the waveguide pipe and connecting the pipe on the feed to the pipe on the LNA through mating (compatible) 'flanges'.

The early LNAs had an adapter on them that allowed you to plug a piece of cable, coming from the feed-probe to the LNA, into the LNA. All cable has something known as 'characteristic impedance'. That means that the cable, like the dimensions on the waveguide pipe, has to be designed to carry energy in a certain manner. The 'impedance' of the cable describes, in technical terms, the technical parameters of the cable. It has always been very important that **the impedance of the probe** inside of the microwave pipe/feed, **the impedance of the cable,** and, **the impedance of the LNA's input stages** 'match' one another. A '50 ohm impedance' was selected as the proper impedance for all three elements in the system since 50 ohm (impedance) cable was readily available, and the LNAs were supposed to also have a 50 ohm impedance.

When the feed matured so that we were bolting the feed directly to the LNA, flange to flange, those flanges and the dimensions of the pipe that carried the microwave signals from the open mouth end of the feed into the open mouth end of the LNA were carefully designed so that they, like the cable, had a 50 ohm impedance.

Matching the impedance, from feed mouth to LNA amplification stages, is critical to performance of the system. If there is a 'bump' (some impedance that is not 50 ohms) someplace in the system or circuit, some of the microwave energy is blocked or lost at that point. Since we have such a low tolerance for losing any signal in the system, even a small amount of signal lost is noticed in a TVRO system.

Now let's jump ahead to the polarization rotational scheme.

The ability to directly bolt the feed to the LNA, waveguide pipe to waveguide pipe through mating 'flanges', worked just fine. Eliminating the cable between the probe on the feed and the probe inside the mouth of the LNA was a step forward. (Look inside your LNA's 'mouth'. Inside you will see a piece of metal, shaped like the letter 'T', or 'H' or something similar. This is the 'probe' or 'antenna' which captures the microwave energy that arrives inside the LNA 'mouth', and carries that energy inside the LNA proper where the signals are amplified.)

Alas, the probe inside the mouth of the LNA is polarization conscious. If you hold the LNA in one position, the probe inside of the LNA mouth faces **up and down** and when it does this the LNA system is now only capable of responding to signals which are **'vertically polarized'.** If you take the whole LNA and turn it over, 90 degrees, now the probe also turns so it runs **left and right,** parallel to the gound you are standing on. Now the probe only responds to signals which are **horizontally polarized.**

The first polarization switching system consisted of an Alliance Antenna Rotator which did just this; the LNA plus neutral-to-polarization feed horn were physically rotated, in front of the dish, so the probe inside of the LNA would face the appropriate up and down direction for the vertically polarized signals or left and right for the appropriate horizontal polarized signals.

In making commercial gain for Chaparral, Taylor Howard returned to the original concept of a probe in front of a probe; he created a system for manufacture which placed a new 'secondary probe' out in front of the LNA's own internal probe. And he made it possible, by operating a small motor, for that probe located in the feed to 'flip' from one position to another position.

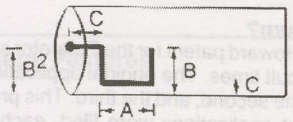
The difficult part? See diagram **'Feed Basics # 4'.**

A rotating probe, one that changes its position inside of the waveguide pipe, had to have a motor. A small motor. It also had to have some very precise electrical properties since we had to be able to insure that this probe-that-moved did certain things which changed the polarizationof the signal without upsetting the 'impedance' of the LNA portion of the system. Remember, the LNA must see a 50 ohm

impedance connection, from the feed itself, or the performance of the LNA is seriously degraded.

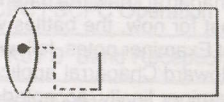
As Taylor explains it, and makes his claims for patent-ability, the probe's dimensions are in two segments. First we have the obvious lengths involved. The probe (as shown in diagram # 4) has a section

FEED BASICS - #4

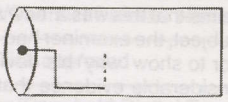


A QUARTER WAVE PROBE (DISTANCE B) CAN BE HOOKED DIRECTLY TO THE LNA, WITHOUT ANY COAX LINE BY BENDING AN EXTENSION OF THE PROBE (A, B^2) SO IT IS POSITIONED A SPECIFIC DISTANCE (C) AWAY FROM THE METAL ON THE INNER WALLS OF THE FEED/WAVEGUIDE; SIMULATING A "50 OHM" COAX LINE BETWEEN THE EXTENDED PROBE WIRE (A, B^2) AND THE INNER WALL OF THE FEED.

FEED BASICS - #5



PART OF THE "PROBE" THEN ACTS LIKE AN ANTENNA TO PICK UP SIGNAL (SOLID LINE), WHILE . . .



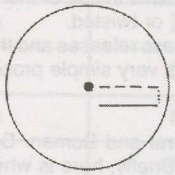
THE REST OF THE PROBE-WIRE ACTS LIKE A 50 OHM TRANSMISSION LINE (SOLID LINE).

which acts as a 're-polarizer'; segment 'B' in the diagram. However, to make a physical connection between this polarization 'skewing' segment and the motor, the probe has to somehow connect to the motor. It does this by taking the outline form of a 'ladel'; dimension 'A' carries the support for 'B' back towards the motor while dimension B^2 and C completes the physical connection.

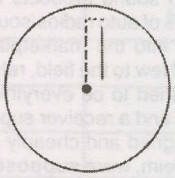
In making patent claims for his system, Howard says that the second set of dimensions are critical. They are shown as distances 'C' in diagram # 4. Howard suggests that the probe 'wire' must itself have an impedance of 50 ohms. Normally you have a 'wire' or 'cable' impedance only when there are two distinct segments to the cable; coaxial cable, for example, has the inside solid or stranded portion(s) and the outside braided (copper) or solid (aluminum) portion(s). You cannot have a 'low' impedance such as 50 ohms unless you have both a 'carrier wire' (the center conductor in coax) **and** a 'counter poise' wire (the shield on coax). How was Taylor to make the single wire probe act like a 50 ohm impedance?

The inside walls of the microwave pipe are metal. "**Why not**" pondered Taylor "**consider the inside walls of the pipe as a cable designer would consider the** 'counter poise' **portion of coaxial cable?**"

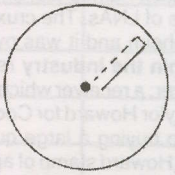
FEED BASICS - #6



ROTATING THE PROBE WITH AN ELECTRIC MOTOR CAN POSITION THE ANTENNA PORTION HORIZONTAL (SHOWN), OR



VERTICAL, OR . . .



VIRTUALLY ANYPLACE IN BETWEEN.

In effect, by bending the 'A' portion and the B^2 portion of the probe so that their distance from the nearest inner walls of the microwave pipe were a precise distance from the inner walls (the 'C' distance), he felt he could 'simulate' a 50 ohm impedance for the rotating probe. And now, he felt, he could make some 'new and novel claims' for his device' claims which would, he hoped, lead to a patent for the device.

See diagram '**Feed Basics # 5**' here.

Working in a notebook on the breakfast table in Orlando, Howard drew this out for **CSD** and explained how the complex impedances inside of the waveguide pipe could be controlled. His 'novel application of technology', he explained, was the way he was treating the probe wire as a physical entity.

A portion of the wire was pretending it was a probe antenna. **The remainder of the wire** was pretenting it was a piece of transmission line. The two, working together and connected to the rotational motor, created the '**illusion**' of making the incoming microwave signals 'swing in space' so that **as** the microwave signals left the waveguide pipe of the feed and headed towards the real world probe installed in a fixed position inside the mouth of the LNA, vertical and horizontal would 'swap'.

As the probe rotates: The probe's shape is key to making the system work. As the illustrations explain, only a portion of the probe is an "antenna" while the balance, in theory, is a transmission line. All of this has a certain amount of "frequency sensitivity" and performance using this design is subject to different performance results through the 3.7 to 4.2 region. When C-band as expanded to include down to 3.4 GHz, bandwidth was stretched to the breaking point and one end or the other suffered badly.

Not just the probe: Although Chaparral was betting "the company store" on the correctness of their rotating probe patent, there were other problems with their product status not apparent when this report was written in late 1984. Remember the "scalar rings" which create a "load" on the front end of the microwave waveguide? Patents issued to Antenna Downlink Inc. (ADL) covering their Hybrid Mode (feed) would eventually result in Chaparral being found to be in patent violation. So while Chaparral succeeded in putting Boman out of business, ADL had the last word on patents in court.

We wrap this up with diagram **'Feed Basics # 6'.**

The polarization rotational probe is a 'spoiler'. It floats inside of the microwave pipe/feed and it is moved around within its chamber by a motor. Any piece of metal, even a piece of non-metal such as a chunk of fiberglass circuit board, stuck down inside of the waveguide pipe, is going to 'upset' the delicate balance of the microwave energy captured by the feed and carried into the pipe.

By moving the probe around inside of the pipe, you can force the microwave signals to move around in space. If you move them in one direction, they assume a new 'polarization' inside of the pipe. If you move them in another direction, they assume an opposite polarization. Or, you can park the 'spoiler' piece inside of the waveguide so that both polarizations are 'skewed' or twisted.

And all of this fuss, all of these press releases and these threats of suits and counter suits are over this very simple process!

BEFORE The Probe Turned

No love is lost between Chaparral and Boman. Boman accepts some of the responsibility for this. Briefly, here is why.

Boman Industries first appeared in the industry at the Anaheim, California trade show in November of 1981. Boman has been building and importing auto radio and auto sound products for several decades. It is one of the major suppliers of auto radios/sound in the USA.

Boman's initial Anaheim entry into the marketplace was predicated upon some bad information. New to the field, relying on outside consultants for guidance, Boman tried to be everything at once; an antenna supplier, an LNA supplier, and a receiver supplier. The early Boman antennas were poorly designed and cheaply promoted. The early Boman LNAs, shown in Anaheim, were **supposed to be** manufactured in Korea. That never happened and Boman came back with a popular US brand LNA which bore their nameplate, and subsequently went to Japan for a high quality line of LNAs. The crux of the Boman/Chaparral problems began in Anaheim and it was over receivers.

There is an untold story within the industry regarding something called 'The Entertainer' receiver; a receiver which fable says was created and designed by one H. Taylor Howard for Cook Communications in Canada. Boman ended up buying a large quantity of these receivers, which bore the H. Taylor Howard stamp of approval. Taylor, the industry's technical leader, dis-liked being associated with Boman, even after the fact, and those 'Entertainer' receivers re-branded for Boman became a bone of contention.

If Taylor Howard was not overly happy with Boman's use of 'his' receiver, he liked even less what happened next. Boman got into the feed business.

Now Chaparral was the number one feed supplier in the home TVRO business from the day that Howard and partner Taggart introduced their now famous 'Super Feed' in the summer of 1980. The 'Super Feed' (with the scalar rings) did so well in the marketplace that it begged copying. Well, it begged copying because it was doing so well, and, because it was a tad on the expensive side. A whole 'world' of copies opened up; people in Tennessee were copying 'Super Feeds' with their own aluminum casting operations, people in Minnesota were copying the 'Super Feeds' by making them out of plastic and coating the plastic with a (very) thin layer of metal, and so on. But none of these 'copies' approached the business like Boman did. Where other 'copies' simply knocked off the original, Boman sat down and developed a complete marketing package and marketing program around **its version** of the 'Super Feed'. And Boman, unlike the others, backed their product up with a splashy advertising campaign. Boman zeroed in on something that particularly incensed Howard and Taggart; **the price of the Chaparral product.**

Boman wasted no time and minced no words with its promotions. It admitted to what the scalar feed it was building cost it ("under $5 each, in a carton"), and then it priced its version about 50% lower than the Chaparral at the time. The point drove home well; some suppliers felt that Chaparral had been 'price gouging' because of its 'exclusive source' position with the product. Never opening their own books up to bare their own cost structure to counter the Boman offensive, Chaparral lowered some of its own pricing and put a black mark on the wall next to the Boman name. The time would come . . . when Chaparral . . . would even up the score.

If the battle between Boman and Chaparral over the 'scalar feeds' was nasty, it was but a prelude to what followed. The rotational probe war was still ahead.

DID The Probe Turn?

The H. Taylor Howard patent for the Polarotor system was not won without some difficult times. The original application for a patent was rejected. So was the second, and the third. This process went on until nearly ten different applications were filed, each modified from the original. The problem was 'prior art'.

Prior art in the patent field means that what you are claiming, as unique and novel about the gadget you seek to patent, is in fact not unique and novel; that somebody has done it before you. The Polarotor applications were 'bouncing' because the U.S. Patent Office and the Patent Examiner kept finding a trail of prior art with polarizaiton switching and rotational schemes.

There were two instances of prior art which the Howard/Chaparral patent application kept stumbing over. One was a patent granted in 1959 to a fellow named Murphy (see **CSD** for December 1983; page 10). Murphy clearly was the first to obtain a patent on a system which did essentially (or exactly) the same thing as the Polarotor. Murphy's patent ran out recently. Taylor Howard knew this.

"One of our problems in getting a patent" said Taylor to **CSD** during the Orlando show **"was a patent granted back in the 50's".** We reached into our briefcase and pulled out a worn copy of 'Murphy' we had been toting around with us for months. "You mean this one?" we asked.

"Christ" said Taylor **"Taggart will have a hemorrage when I tell him** you **pulled out a copy of Murphy!)).** This was November 2nd, just days prior to the long fought for and hard won patent award. On the 2nd of November Chaparral knew the patent would be issued on the 8th; for them, at least for now, the battles were over.

If one studies the Patent Examiner notes, following the full course of events from the initial Howard/Chaparral application for a patent until the balking Patent Examiner finally 'accepted the claims' being made for the device, one clearly sees Murphy threading in and out of the story from an early date. There was at least one other important bit of prior art as well; we'll come back to that shortly.

The very last notes in the Patent Examiner's file deal with his crucial doubt that the Polarotor **really was** unique and novel. By this time the application had been amended many-many times, each time attempting to redefine what the device did in words and diagrams which would enforce the claims that this was a 'new and novel' design. In his last 'hearing' on the subject, the examiner had Taylor Howard on the spot. It was up to Taylor to show 'why' his device was novel and different, in the face of considerable evidence that it was not.

Howard relied on a trio of scope screen photographs. They purported to show that the Chaparral Polarotor design had 'lower loss' or a better 'impedance match' than any of the 'prior art'. You should, perhaps, now go back and re-study the Howard explanation of his moving probe and his use of the inner walls of the waveguide as a 'counter poise' for his rotating probe, on page **22** here.

WHICH Probe Turned First?

Getting a patent granted, even against the opposition thrown up by the inquisitive Patent Examiner, is one thing. Defending that patent against all 'interlopers', or proving if required in court that your use of this technology was 'first', is quite a different matter.

Patent law creates a system for **registration of** 'new and novel' concepts or ideas or gadgets. It does not allow itself to be the 'court of last resort' if there are counter-claims against a patent **(after the patent is granted).** That is a function of the civil courts.

In affidavits filed with the Howard/Chaparral patent application, Howard says be 'began design work on the device in August of 1981 and finished that design work in November of 1981'. The dates are important.

Another bit of prior art which the Polarator kept stumbling over was a design credited to one **Gene Augustin** of **Antenna Technology Corporation** in Orlando, Florida. Augustin claims to have developed a system that did the same thing late in 1980. **"I was returning from a meeting in Arizona"** recalls Augustin **"and had several hours to think while crossing the country on a jet."** This was December of 1980. **"I drew myself a series of sketches for a polarization**

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As the word turns: By now you may be saying to yourself, "*these people were crazy!*" First they design a product which very possibly was not a true invention (Murphy, again - see SF October, p. 8), attach it to a feed which within a few years they would be told in court was not theirs to begin with (reference ADL patents for the Hybrid Mode design) and then they named it with a word which belonged by trademark registration to Polaroid. What did they get out of all of this? Well, they sold an estimated 5 million feeds with profits of up to US$10 each; "50 million reasons" to do what they did.

rotational system". Back at his own shop, he had some samples made up and he tested them in January of 1981. He showed working models at a Texas cable show in February of 1981 and perfected, and then esentially dropped interest in, the design in April of 1981. Still, Augustin did display at the Omaha trade show in the month of **August** of **1981** and his version of the system was on display and seen there.

In initial affidavits filed by Howard and Chaparral it is claimed that Howard did **not see** that display. Later affidavits on the same subject seem to suggest that Howard **was aware** of the Augustin design in August of 1981.

If Chaparral was creating its own 'novel and new' device during the late summer and early fall of 1981, Boman's Maniachi was going about the devide in a different manner. According to Maniachi "We contacted Gene Augustin and asked him for a license to build his unit. We subsequently obtained such a license and we have been building our Polar-Matic devices under a license from Gene Augustin, since that time."

So who was first? Taylor Howard, or Gene Augustin?

Augustin professes little interest in the matter, now heading up the world's largest manufacturer of 'Simulsat' antennas, he is very much pre-occupied with getting his up to seven meter surfaces installed in locations all over the world. In between trips to Taiwan and other exotic points, he is barely available to help Boman in their legal squabbles with Chaparral.

"We probably made a bad mistake by not making it better known that we had taken out a license with Gene Augustin" reflects Boman's Bob Maniachi. **"People have believed the story that we** 'stole' **the concept** from Chaparral **and in the eyes of the industry that automatically makes us the bad guys.** When Chaparral tells a story, they start with the way we got into the receiver business. Then they graduate with our getting into the 'Super Feed' business. Finally they draw the noose around our neck with their view of our building rotating probe feeds. It certainly is a convincing story and we are therefore guilty."

-OCCUPATION WITH Simulsat antennas up to 7 meters in has kept Augustin out of 'thick' or 'Polar' battles.

Augustin has no patent protection. He had prepared a patent application, at the urging of Boman, but when the patent application bounced back (Murphy, again) Augustin set it aside being more concerned about seven meter Simulsats than rotating probes. Boman then urged Augustin to keep after the patent application but in that interim the Howard/Chaparral application had moved forward several steps. It would be the first out of the 'chute'.

THE CHAPARRAL Offensive

Patent granted, Chaparral went on the offensive. They probably felt it was time to square the account with Boman. In its widely circulated press releases Chaparral charged Boman with the following:

1) Patent infringement,
2) **Trademark infringement,**
3) **False designation of origin,**
4) **Unfair competition,** and,
5) **Unfair business practices.**

The claims for the patent infringement are pretty obvious; if Chaparral has a valid patent, if Gene Augustin did not have prior (unclaimed) art, then Boman may well be violating the recently granted patent.

The four that follow are described by attornies as boilerplate: "charges brought for their 'PR' value". At least that is how **Boman** attornies describe them. Some of the ancilliary charges are worth noting here since even they seem to be controversial.

Let's focus on the trademark infringement. A trademark is a service mark. It describes a product or service or company and it has value. XEROX is a trademark and it is a proper name. Properly printed, it would always be XEROX®.

Polarotor, says Chaparral, should always be printed as Polarotor™. If you read the fine print in advertisements in **CSD** where receiver manufacturers tell you that their receivers are designed for compatibility with the Polarotor device, you will usually see POLAROTOR® or ™. A company has to **protect** its trade or service mark from 'interlopers' for if it fails to prosecute firms that mis-use the trade or service mark, they have lost the right to claim it as their own trade or service mark.

Chaparral says that Polar-Matic is so close in spelling and sound to Polarotor that **"this leads to confusion within the industry".** They further claim that dealers who 'think' they are buying a 'genuine Chaparral' product are often 'mis-lead into buying a competitive product by Boman' because of the similarity of the two names. Boman obviously would take exception to this. Others who use the pre-fix 'polar' (such as Polatron) would also probably disagree with this supposition. Chaparral, none the less, dwells in their suit filed against Boman on this subject at some length.

Because Chaparral seems pre-occupied with this issue, **CSD** did some checking to determine the exact status of the Polarotor trade mark. We came to an interesting discovery. We could find no record of such a trademark issued in the name of Chaparral Communications. We did find more than 200 'Polar' this and 'Polar that' trade service registration marks on record, however. **Polaroid** owned every one of them. What's more, they have owned every one of them for a number of years. As many as 30 years to be exact.

That led us to Polaroid where we found a gentleman in their legal department who specializes in such things. What could he tell us about Polarotor?

"Polaroid went in as far back as thirty years ago and filed trademark registrations on virtually every possible word combination that began or ended with polar" we learned. "We have used these names for various products and services from time to time, or they have lain in our 'trade mark bank' just waiting for the best and most appropriate use." And Polarotor?

'An exception to the use of the word has been filed' we were told. **"On June 21, 1983 an application filed by Chaparral was stopped at Polaroid request. On July 25th this temporary halt to the processing of the Polarotor request was made permanent'.**

Then Chaparral had no trade mark rights to Polarotor when it began placing ™ next to its product name?

Boman's Maniachi on his use of Polar-Matic.

"Yes, it turns out that Polaroid does own just about every conceivable derivation the world 'polar' ----. In fact, our Polar-Matic name was granted to Polaroid under Trade Mark registration number 1,095,805 some years ago." And what is Boman doing about its own infringement of the trade marked name?

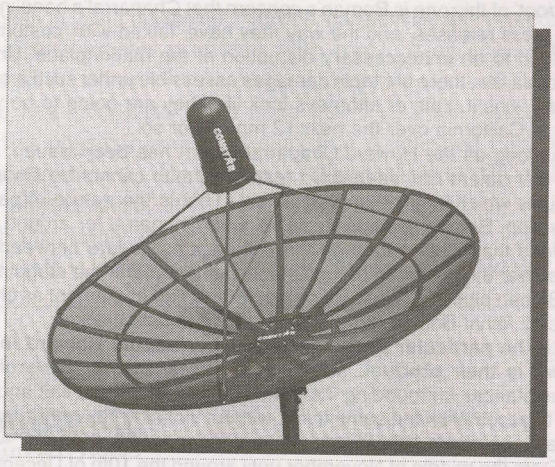
"We are negotiating with Polaroid, hoping to obtain the legal right, under contract, to use the name in commerce."

What about the last four listings in the complaint filed by Chaparral: those that charge Boman with violating of a Chaparral trade mark, and as a result of that 'violation', engaging in 'false designation of origin' (adopting marketing practices which tend to make the customers believe the products being sold by Boman are actually produced by Chaparral), unfair business practices and unfair competition?

"Our attornies say this is just boilerplate, designed to cause disruption in the marketplace and to cause buyers to swing their orders to Chaparral for fear that in dealing with Boman they will become liable for legal claims Boman is liable for." And the questionable status of the

ANY WAY YOU LOOK AT IT ...

ST-7



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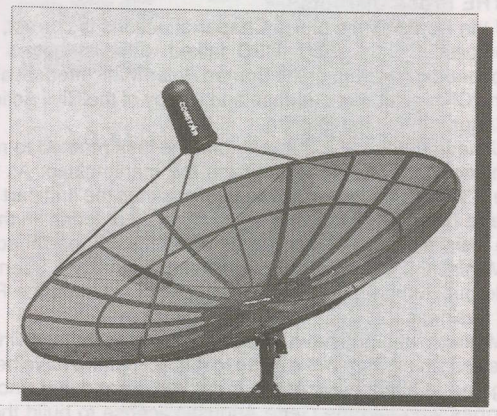

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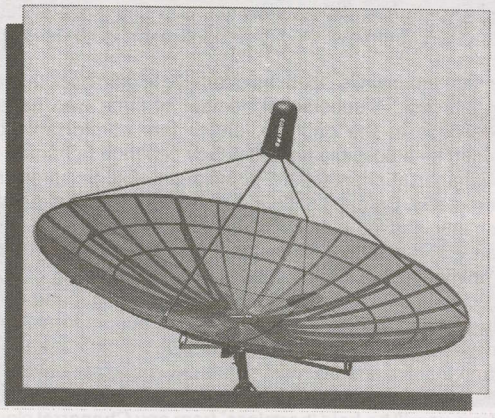
ST-12



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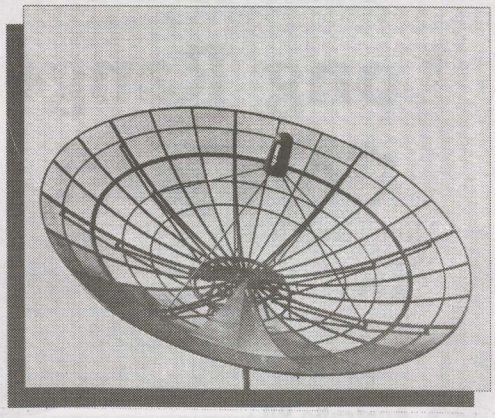

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Post report catch up: Boman gradually gained back market share but the cost of battling Chaparral eventually forced the company out of the TVRO hardware business. Meanwhile, a sleeper event not anticipated by Chaparral. California firm Antenna Down Link, Inc. (ADL as we know them today) won six patents covering Hybrid Mode and Co-Boresight (C + Ku) designs. Eventually, a California court found Chaparral to be in violation of ADL patents (Case no. Cv-91-4955-aw(ex)) which is where the matter stands 16 years after the original report.

Chaparral use of the phrase 'Polarotor'? "Very strange indeed that they would bring up trademark infringement against us when Polaroid has stopped their own use of that name on exactly similar charges!"

AS THE Probe Disrupts

If the Boman view of the Chaparral actions is correct, Chaparral accomplished their goals. **CSD** talked with distributors who were discontinuing handling of the Boman Polar-Matic product after receiving the Chaparral news release and a copy of the Civil Action brought by Chaparral against Boman.

Unserved, formally, Boman none the less reacted to remove the offending Polar-Matic product from the marketplace. As luck might have it, there had been a shortage of castings the first part of November and Boman found only a small quantity of feeds 'in the pipeline' from their factory to dealer hands when the Chaparral action hit.

Maniachi. "**We recalled every feed instantly.**" Seemingly, that would put Boman out of the feed business; at least the Polar-Matic feed business.

Maniachi again. "I have to thank Taylor Howard for giving us a 'kick in the ass'; this action woke us up to the fact that we have been playing the game as a defensive action from day one and that since **we were the ones** who had the Gene Augustin license to build the feed, **we should have been on the offensive** rather than the defensive."

Two types of wheels starting grinding at Boman. The legal ones first. Boman says it will challenge the patent in court. It had engaged two Los Angeles firms that specialize in patent law. Maniachi characterizes this action as "long, drawn out and expensive." He has $200,000 budgeted just to get it off the ground, says he will spend whatever is required. His desk is occupied by copies of more than 50 patents, issued in the microwave world, as he speaks. Attorneys and para-legals are pouring over every possible patent that has **ever been Issued** dealing with microwave waveguide, switching systems and polarization moving schemes.

There is a possibility of a second lawsuit; this one involving charges of Restraint of Trade, Anti Trust, and marketplace Monopoly. The 'root' of this one is Boman's concern that Chaparral's handling of their press releases, and the way they have 'talked with' customers has lead to an unneccessary disruption of the marketplace. Under California law, there are triple damages assessible under such a suit if Boman wins it. Lots of attorneys look like they are going to be very busy in California over the next 12 months or so.

As long as the Howard/Chaparral patent has been issued, and until that patent has been court tested, Boman cannot be shipping products which infringe on that patent. That is the nature of patent protection. Boman expects to 'settle' with Chaparral for around $10 per feed that slipped through the call back procedure between the November 8th issuance of the Chaparral patent and the stopping of the Boman pipeline. Maniachi characterizes that settlement as chicken feed. What Boman did next was to find a new chicken.

"**If the particular probe system described by Howard in the patent is their product,** subject to a review by the courts of the circumstances surrounding the patent claims, we had to find another way to accomplish the same thing; without violating Howard's patent, nor anyone else's either".

From the middle of November until around the 10th of December, Boman shipped Polar-Matic feeds which employed a 'fall back position probe' which Boman had kept underwraps for some time. "We didn't use it previously because it increased the production time per unit" says Maniachi. "But faced with no shipments, or spending extra time on the manufacture and test, we elected the latter".

Then starting in mid-December Boman brought out an entirely new probe system; which was developed for it by a consultant from the California Aerospace industry. Always the bottom-line marketing man, Maniachi talks about the new probe.

"It is our 'Turbo-Charged' model. It is absolutely the best probe this industry has ever had in a feed. Every test we make confirms that it has lower loss, a flatter response across the 3.7 to 4.2 GHz band, and a better ability to carry microwave energy than any other probe ever available".

The new probe is 'gold plated' and the shape, important to both the performance and avoiding a new war with Chaparral, is described as 'revolutionary and new'. A patent application is being prepared.

Boman, meanwhile, is on the offensive to gain back those distribution outlets lost. A substantial number of firms who have handled Boman feeds in the past no longer feel comfortable doing so. threatened by a possible lawsuit if they continue to handle the feeds which Chaparral charges are in violation of their patent rights. To counteract this, Boman is offering to indemnify any users of its feeds against any and all claims or damages as might be awarded to Chaparral by a court. "I fully expect the courts to determine that we have **not** violated a patent held by Chaparral, that Chaparral has engaged in unsavory business practices, that Chaparral **has used** threats and intimidation to keep business people from handling our own feeds" warms up Maniachi. **"But first,** we have to keep the doors open and that means we must somehow make the buyers feel comfortable when dealing with us. We are guaranteeing that anyone who buys from us will be held 'harmless' from any Chaparral claims, to put the customer's minds at ease".

The industry is surely confused over this 'in' and 'out' fighting going on. Antennas OEMs in particular, faced with buying Boman product **and** a possible contingent liability in the form of awards from a court of law, **or,** buying Chaparral and paying more for product that includes the 'peace of mind' that there are no contingent liabilities, are usually opting for Chaparral. Since Chaparral probably had better than a 75% 'share of market' before all of this came up, the suit has pushed them even closer to the magic '100 percentile' mark.

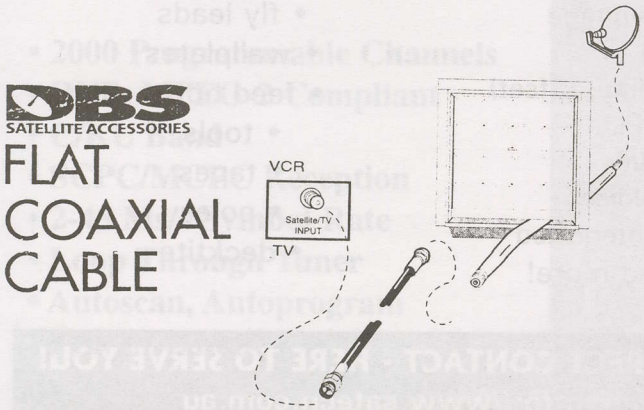
Perhaps the real winner in all of this, in the short term anyhow if there is a winner, will be a firm such as M/A COM's Omni-Spectra. Using a technology which appears to be all their own, Omni-Spectra has been picking up ground rapidly of late built largely on the strength of an aggressive advertising and marketing program. If antenna OEMs and major distributors tire of being caught between Chaparral and Boman, they may well turn to Omni Spectra for feeds to tie them over until the presently confusing situation settles down.

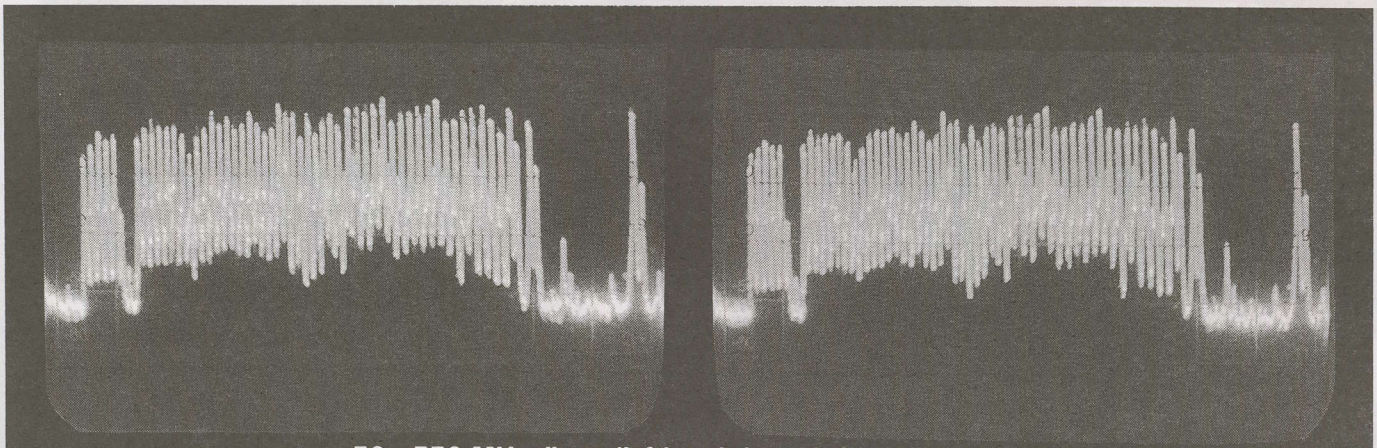
Dick Smith's missing parts

America's Radio Shack has interesting toys

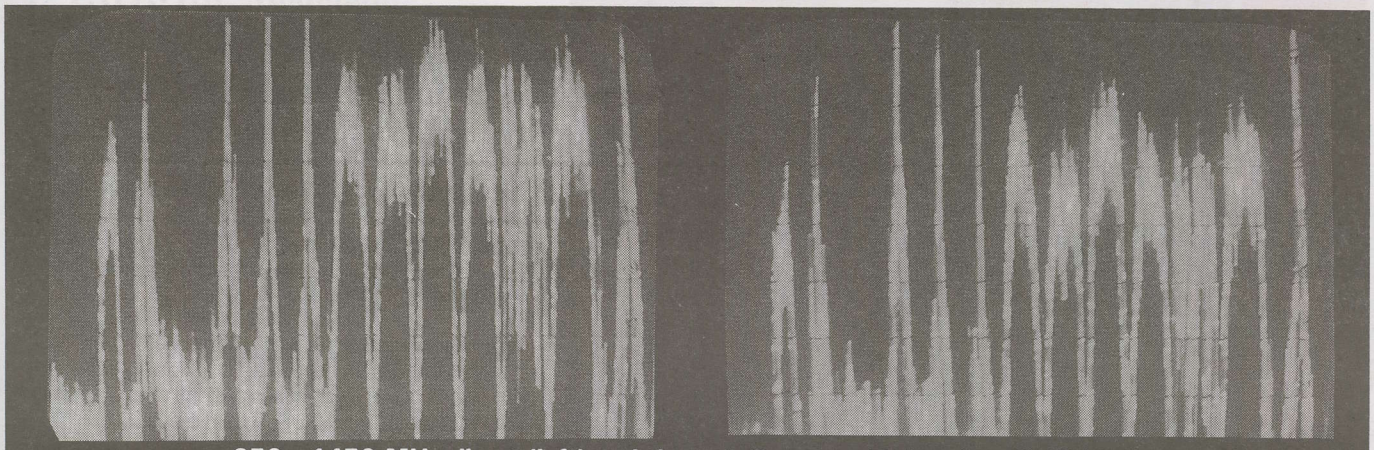
We all know coaxial cable is round, and for a reason. And if you smash it flat, unsavoury things happen to the impedance which in turn creates problems with transferring energy from one end to the other.

Here is a US "DBS" (Ku band pay-TV) after market item that defies physical laws. It is coax that is smashed flat! *Why?* See drawing below. *Does it work?* The top set of off-analyser screen photos show 50 - 550 MHz. Left is direct, right is through the flatten cable. No loss here. Below that, 950-1450 L-band (left is direct, right through cable). When would you



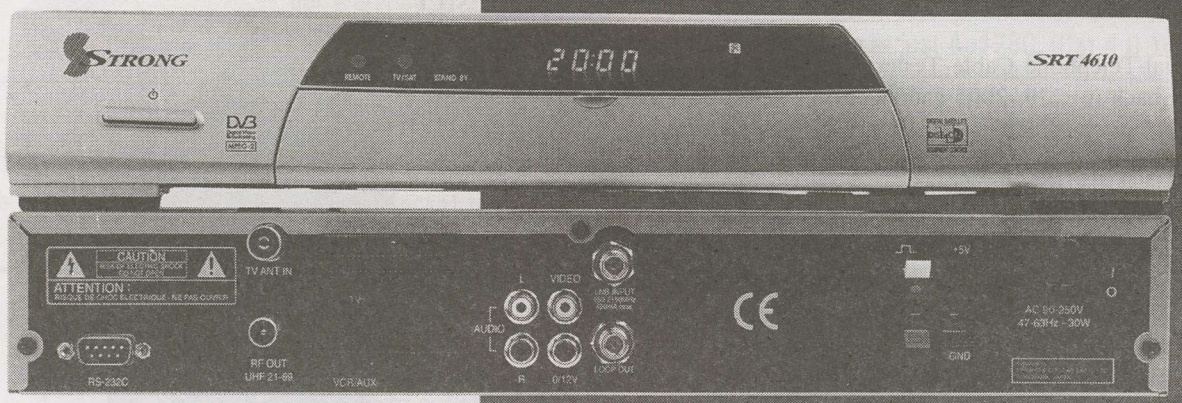


50 - 550 MHz direct (left) and through flat coax (right)



950 - 1450 MHz direct (left) and through flat coax (right - 1 to 2 dB loss)

> p. 18



SRT 4610

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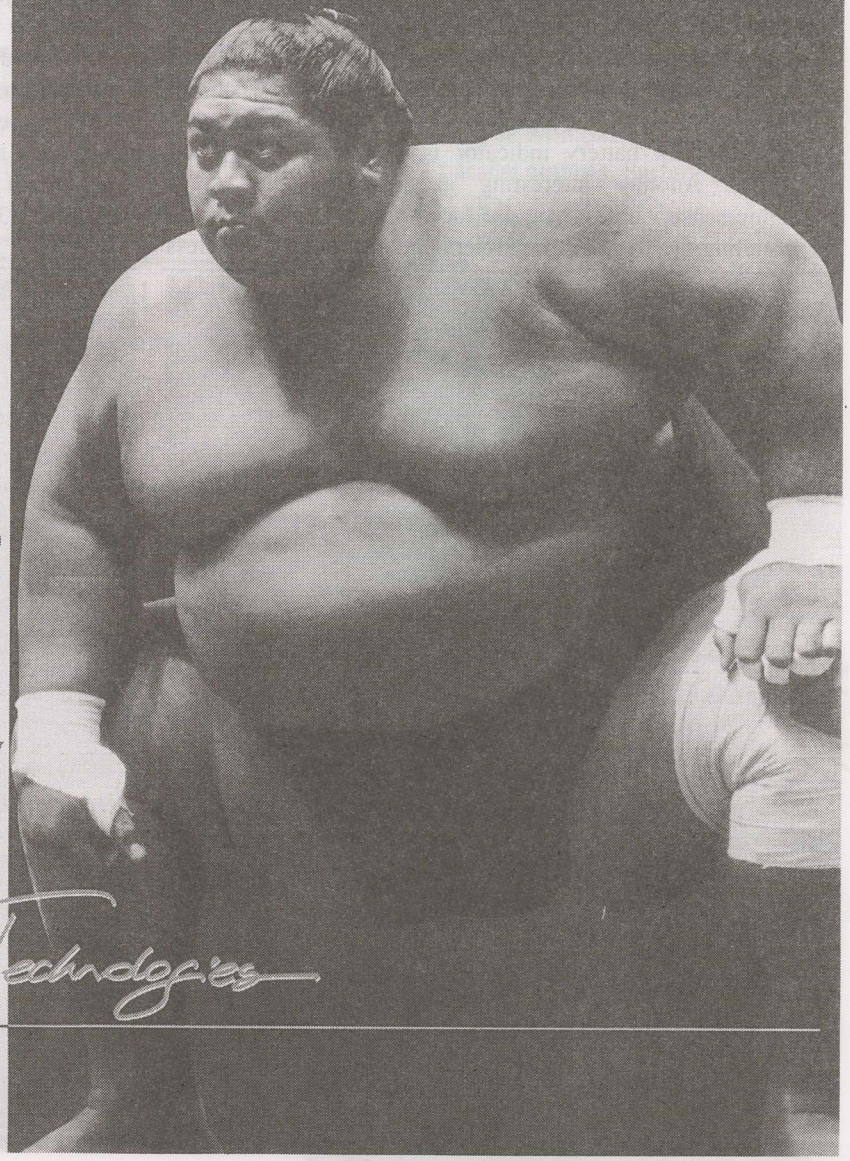
- DVB, MPEG-2 Compliant
- C/KU Band
- SCPC/MCPC Reception
- 2-45 Ms/s Symbol Rate
- Loop Through Tuner
- Autoscan, Autoprogram
- PID Insertion
- On Screen Graphics
- 4 Digit LED
- DiSEqC 1.2
- 8 Universal LNB Control
- Mechanical Polarizer Control
- 0/12 V External Switching
- RS-232C Service Port
- Upgradable Software
- Data Transfer Between Units
- Teletext Insertion
- Electronic Programme Guide (EPG)
- Parental Lock
- Auto Power Back On
- PAL/NTSC Modulator
- 21-69 UHF PLL Modulator
- VCR Loop-Through on Stand-By
- Auto Voltage (AC 80-260V) SMPS



STRONG Technologies

< p. 15

use such a thing? As the drawing shows, to sneak through a closed window. Yes, it *does* pass power (IRD to LNBf). Can *you* figure out *how* they do this? (part number RCA D911, US$5.95)

The Coaxial/Telephone Cable Tester is an interesting item from Radio Shack (p. 229, 2001 catalogue). Powered by a 9v cell, there are four status indicator LEDs, two female F fittings and four standard telephone line jacks. Coax first.

Start by connecting both ends of a piece of coax line to the pair of fittings. Hold down the "push" button and the LEDs flash in sequence settling down with an indication of whether the cable is good, shorted or open. Not good for testing an LNB line from inside (or vice versa) unless you can get *both* ends plugged in simultaneously, but very handy for testing jumper cables such as between IRD and VCR or TV. Yes, if you have an install with two pieces of RG6 (one for C, one for Ku), you could link the two at either end to complete a circuit, and then check the combined runs in this manner.

The telephone test functions are more versatile and should be very handy for Pacific pay-TV installers now *forced* to deal with telephone line extensions to IRD modems.

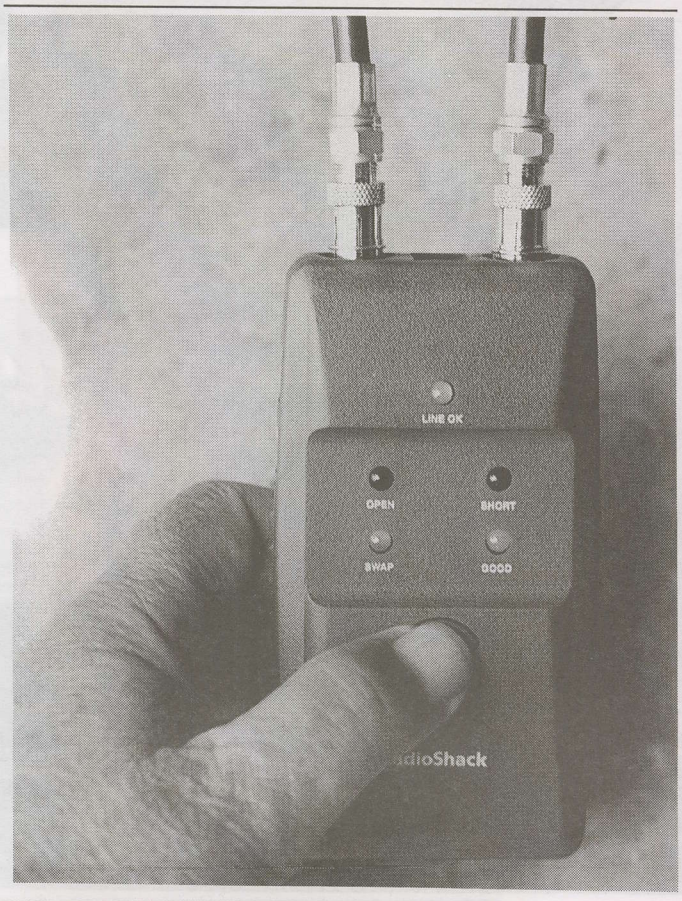
1) Like the coaxial test loop function, plug both ends into sockets J1 and J3. The LEDs tell you whether the cable is good, shorted, open or - *this is handy* - has the polarity swapped.

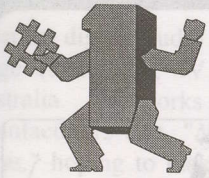
2) After you have extended the telephone line to the IRD location, with this tester you can measure the following:

a) If the line is good (green LED)

b) If you have the polarity reversed (red LED) - reversed polarity has an adverse affect on data transfer (Internet) or will typically cause the IRD modem to function erratically.

A self-check battery indicator is also built-in. Price is US$17.99. Another interesting gadget might not make economic sense - unless you are faced with a horrendous job for installing the IRD required telephone modem. A "Wireless phone jack" (Radio Shack, p. 168, 2001 catalogue) accepts the telephone connection wherever it may be and also plugs into the AC mains (117VAC, unfortunately). Then it uses the house wiring to "transmit" the telephone connection to a second "extension jack" which plugs into an AC mains outlet elsewhere in the same premise (as long as the two points are not separated by an AC mains customer service transformer). The "extension" unit would be located at the IRD location, and a short jumper cable gets the IRD hooked up to this outlet and thence back to the original "transmitter" point. Anyone aware of a 230/240 volt mains version of this? Radio Shack's price is US$89.99, $39.99 for additional extension units.





ENTHUSIASTS!

We goofed!!! And ordered too many of these 1.8m USA manufactured mesh dishes. Now our warehouse is filled and we have to trim down the stock on this hot, 4 panel dish item. Polar mount. You reap the benefit of our mistake at just Au$280. (Cat # D 1475)

SURGE PROTECTOR!

Don't risk lightening damage to your valuable satellite TV equipment or PC. Install this high voltage arrestor right at the input socket to minimise the danger! Great device (sorry, will not protect against small arms fire). Au$22 (Cat # X1480)

12 way MOTHER of all power boards!

Avoid the embarrassment of burning your house down with unsafe double adapters. An even dozen power outlets for today, tomorrow and your future needs. Compare at Au$42. (Cat # P 2000)

PUT IT ALL TOGETHER with a DUAL BAND COMBINER!

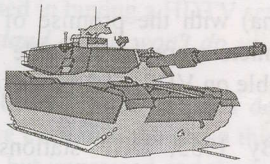
Mix the outputs of 2 LNBs at the dish and feed just a single cable to the receiver. Saves the time and expense of an additional cable run, drilling holes through walls, running into plumbing pipes and electrical wires! Great for high rise buildings. Use a standard IF splitter like our X1550 to feed several receivers. Au$35. (Cat #1750)

CUT OUT all of those extra REMOTES!

Hey - you reach for the remote and the pile is huge. The kids grab the wrong one and switch off your toilet water when trying to change channels. End it all. Cut to the core of the problem with our 4-way "Intelligent" A/V switcher. Use with Sat TV, DVD, cable and more. Detects and switches the active input to 2 parallel outputs. Perfect with a Video Sender! Au$89. (cat #T1951)

ANALOGUE RECEIVERS!

We scoured the junkyards of Asia to bring you this one! Another landfill special, these famous name receivers are remote control, 250 channel, stereo audio, UHF output, on screen display, 2 inputs. These are not new but near new and guaranteed for 12 months. Au$25 each - less if you purchase more than 1! (Cat # R4000)



"OUTBACK" Flux Gate Compass. This hand held digital compass reads azimuth bearing directly and has a unique self calibrating feature that compensates for residual magnetic fields. This means you can use it around steel dish structures without losing accuracy. Au$180. Cat# 1080.

The best IRD we have ever tested! Humax ICRI 5400 embedded Irdeto. Pre-loaded with all Aurora transponders, will receive all C-band (*) FTA channels. Excellent EPG, exclusive "preview" feature. AND - 2 CI slots supporting both Irdeto and Mediaguard CA platforms. 4000 channel capability, 0/12v and DiSEqC, RS232 software upgrades. Special introductory price for SatFACTS readers - Au$895 while they last. A strong US$ means the price on this must go up on next shipment! (Cat #R3200) * - call for latest list.

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

DVB-T stillbirth

In a segment telecast November 2 on Ten Network's "Live This", these statements about the status of DVB-T in Australia:

1) "*Set-top boxes are expected to be available from mid 2001, at a cost between $500 and $1,500.*"

2) "*HDTV receivers will cost around $8,000.*"

3) "*Channel 10 expects to be airing well more than 20 hours per week in high definition before 2003.*"

On October 10, Networks 7, 9 and 10 announced an initiative. Their plan - to go into the marketplace, select a DVB-T set-top design after "competitive bidding," and then order between 20,000 and 40,000 to "guarantee there would be set-top boxes in the marketplace by January 1" (the official launch date for DVB-T in Australia).

A story. In 1953, the US FCC decided to open up UHF (band IV, V) channels for TV. Hundreds of would be station operators filed for a license, and were promptly granted permission to transmit. Unfortunately (*pay close attention*), no TV set then being manufactured had a factory-included UHF tuning ability. So a new market of set-top UHF to VHF converter boxes sprung up; dozens of firms offering US$20 to US$100 boxes that expanded the range of tuning to include UHF, for the then available VHF-only sets.

Consumers were offered these boxes (and a companion UHF antenna) with the promise of more programming. But most consumers were comfortable with the programming already available on VHF, and only a tiny fraction bought UHF set-top boxes.

By 1955, UHF stations were going off the air (in bankruptcy) faster than new ones were coming on the air. A UHF station in Hartford, Connecticut, was running a "prime time movie" every evening at 8PM. But it could not convince advertisers it had an audience watching the movies. So it created a very simple contest.

The announcer said, at 8PM when introducing the movie, "*Tonight we have a cash prize. All you have to do is* be the first *to call us - when we announce the details.*" At the 8.30PM break, he came on and read the announcement:

"*The first person who calls wins $250. No questions to answer, just call us, be first, and $250 is yours.*"

At the 9PM break he repeated the offer, but now offered $500. At 9.30PM he offered $750. At the end of the movie he offered $1,000. Allowing for inflation and today's currency exchange rate, the 10PM offer was worth more than $5,000 Australia, $7,000 New Zealand., Simply for *calling* the station and claiming the prize.

No viewer called. Because there were no viewers. The station had just proven, much to its dismay, that not one single person was watching their movie. The following day the station announced it was leaving the air.

If a tree falls down in the forest and nobody is there to hear it fall, is there a noise???

The Australian 7, 9 and 10 networks were dismayed to discover, late in September, that no manufacturer was planning to introduce a DVB-T set-top box to Australia in time for the January 1 launch date. After they had spent tens of millions of dollars on rebuilding their stations for HDTV/SDTV digital terrestrial transmissions, the folks who design, manufacture and sell the set-top boxes required to view these telecasts were simply saying, "*no thank you, Australia.*"

By spending around Au$6 million to order in what they hoped with be a ground breaking initial order of boxes, the public would be introduced to digital TV. At least this is their fantasy.

Sixteen firms indicated an interest in selling 20,000 + DVB-T units to the consortium. As we go to press, no word yet on whether any of these will actually get a contract. But with less than 6 weeks to go before DVB-T begins in Australia, having more than a handful (100 or less) DVB-T set-tops actually in Australia ready for the launch is unlikely. *From any source.* Unfortunately, Australia has chosen a transmission format (COFDM + HDTV + SDTV + two

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separate digital audio systems) in a transmission frequency range (bands III, IV and V) which is totally unique to Australia. Networks 7, 9 and 10 advised the would-be manufacturers that, "*New Zealand will use the same set-top boxes,*" hoping to make the potential long term market more attractive. In fact, New Zealand has no such interest, digital TV in New Zealand is not yet decided by Government and will not be for possibly another year. But you can't blame 7, 9 and 10 for exaggerating a bit. They are very desperate as is Senator Alston who created this digital monster for Australia.

The reality is that low-price-end DVB-T set-top boxes are leaving the factory with an OEM (original equipment manufacturer) price in the region of US$115 these days. But only for markets where it pays the manufacturer to spend months designing a box for a particular market. The set-top design circulated by 7, 9 and 10 will *only* allow SDTV reception, even with an external multi-thousand dollar digital monitor it won't process HDTV. Anyone purchasing one of these boxes will be less than pleased to learn they are getting the same (or even lower) definition TV as their existing PAL sets. It doesn't take much imagination to see how public reaction, once they learn they have been mislead into thinking they were getting "digital TV," will quickly turn sour on the broadcasters. First you hype digital by calling it the Rolls Royce of in-home TV, and then you deliver a Honda Accord. Not very smart long term planning.

The 7, 9 and 10 set-top box specifications (which were posted on www.satfacts.kwikkopy.co.nz in early October) are, unfortunately for Australia, only good for Australia (no, not New Zealand as well). So 7, 9 and 10 are asking that manufacturers sit down and design a set-top box that when designed cannot be sold in any other country in the world. They are also being asked to "do it cheap" and "to do it fast" so that Australia's terrestrial telecasters and the present Government is "not embarrassed by a lack of public interest in their new service" when it turns on as scheduled 1 January.

It is Hartford, Connecticut all over again.

Meanwhile - in America

The US version of HDTV continues to have horrendous, still unsolved, reception problems. The Federal Communications Commission continues to duck from the serious questions raised. In a nutshell, it requires an expensive, rooftop, aerial to receive and even then a typical location will receive 1, 2 or 3 of the 7 or more local stations. In the photos below, taken at a Circuit City chain store, we *tried* to watch a 15 minute length HDTV demo broadcast. Every few minutes the image stopped and a software announcement on the screen advised "the transmission has been interrupted."

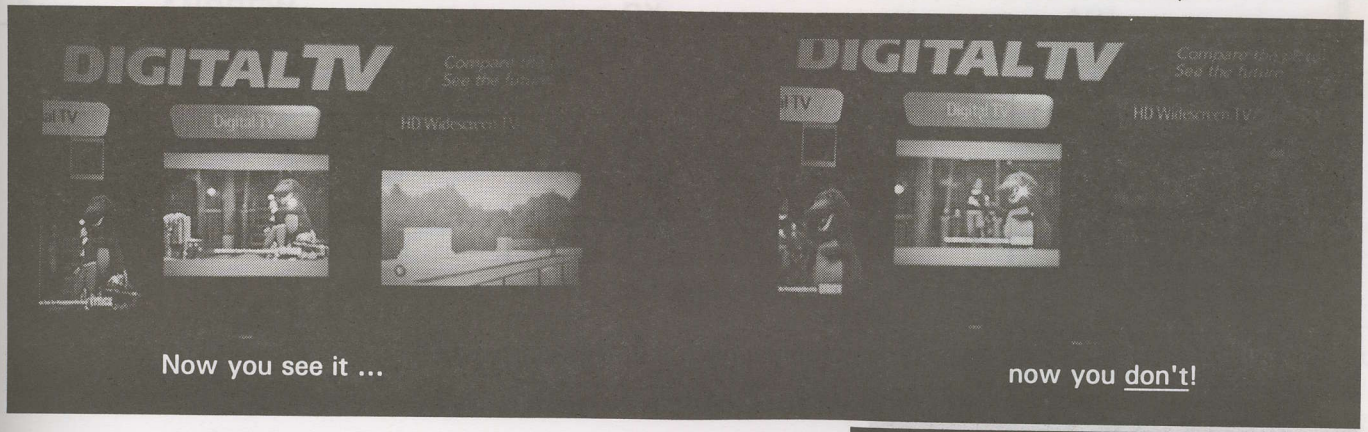
Us to store person: *"What's wrong with it?"*

Store person: "Are you interested in buying a HDTV set?

Us: *"No, we live in New Zealand and it won't do us much good there."*

Store person: "Even if you lived here it wouldn't do you much good! I don't know why we even turn the damn thing on - people who see it are anything but impressed and the few we have sold have all come back."

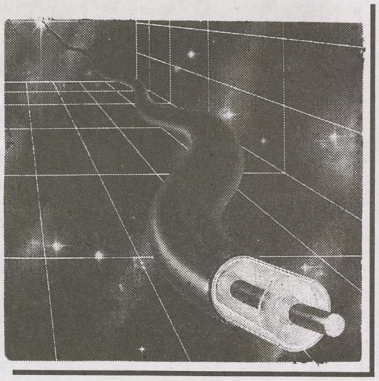
NOW you see it, now you don't. With apologies for the "quality" of the photos clandestinely taken at a Circuit City store in Los Angeles. Three 60+ inch TV screens side by side, far left (cut off in photo) displaying an NTSC terrestrial broadcast. In the middle, a SDTV digital satellite received transmission. On the screen on the right, terrestrial HDTV. *No image on the right?* you say. Well, every few minutes the reception quits and an on screen announcement appears advising the reception has been interrupted.



Now you see it ...

now you don't!

The CABLE Connection



Combining

Gareth E. Welsby, MD at Channel 8 Limited in Port Moresby, PNG has a design dilemma.

"*We are about to make a quantum leap from 32 to 33 channels on our cable system. I use 'quantum' because this particular increase requires the installation of a third combiner. At present we use a Drake 16-way active combiner (which has an extension port) linked to another 16-way passive combiner (lacking an extension port). We don't know of the existence of 16-way passive combiners with an extension port so any approach we have come across means significant rebalancing of headend levels to make it all come out the way it is now.*"

An active combiner replaces the signal mixing loss of a combiner (typically 12 dB with an 8-way combiner, 16 dB with a 12-way, 20 dB with a 16-way) with something approaching "unity gain" - a 16-way active, for example, includes a broadband amplifier capable of bringing the 16 mixed signals back to their original input-to-combiner levels.

Many headends elect to combine at relatively low levels - that is, keep the input levels to the combiners (from modulators, signal processors) down to something in the 80 to 100 dBuV region. By running the modulator/processor gear at reduced outputs, you are less apt to generate unwanted beats and harmonics in the combiners. But this means your after-combining output to the cable system trunk will be down in level as well; entering a 16-way passive combiner at 80 dBuV leaves you with 60 dBuV after the combining "loss."

If your cable trunk input design calls for the lowest frequency signals (such as 45-55 MHz) to be in the region of 80 dBuV while the higher frequency signals (such as 450 MHz) must be in the region of 92 dBuV, this means the respective modulator or processor outputs for 55 MHz versus 450 MHz will be 12 dB apart in level.

The 12 dB differential is the "tilt" in your cable system input to compensate for the "slope" of the cable losses between the headend and the first trunk line amplifier. If the cable run is around 350m of .500 hard-line, that length will typically lose 12 dB more signal at 450 MHz than at 55 MHz. Since the objective is to keep signal inputs to every amplifier balanced, the headend operates with a "tilt" so that 55 MHz arrives at the first trunk amp "flat" (same level) as the 550 MHz signal.

All of this is basic cable design 101A. The design criteria really begins at the input to the first trunk amplifier - how much signal must leave the headend, at each channel in the system, so that the input to the first trunk is within the signal level range required for the trunk amplifier (typically +72 dBuV) for each channel sent through the cable? This number, whatever it may be on a channel by channel basis, "backs up" all the way to the output levels set for each modulator and processor.

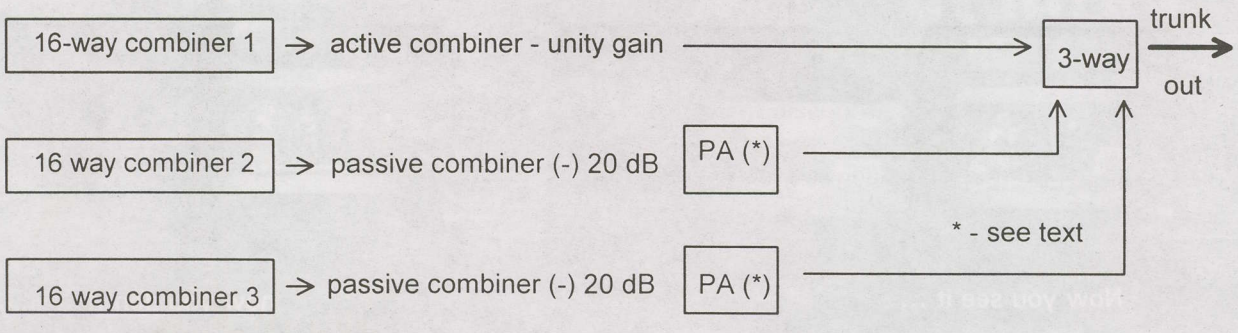
This says that in virtually any combining situation using passive combiners, some form of amplification is required after ("post") the combining. The post amplifier (PA) must be carefully chosen since it is capable of creating new beats and inter modulation products which can appear in channels amplified or other channels on the system.

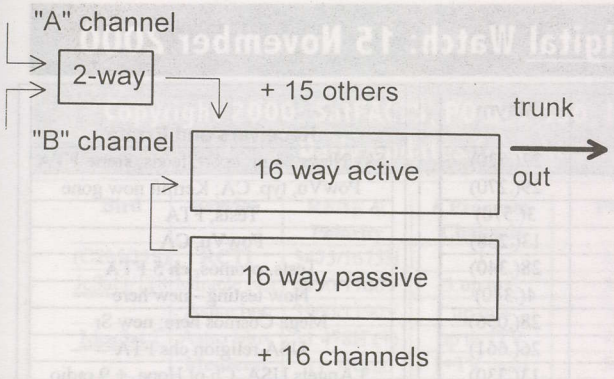
If the maximum number of PA channels to be amplified is determined by the combiner, 16 in our example, a broadband high output capable active device is usually not stressed (most products created for this purpose are rated at 60+ channels so going through with only 16 channels is safe). A typical product is the Blonder Tongue RMDA series indoor rack mounting amplifier.

A more common post amplifier capable of handling 16 channels is the Winersat WCA-40 CATV Distribution Amp. The Blonder Tongue product is available in two gain versions; 30 dB and 50 dB. The WCA-40 is 40 dB. Both have user adjustable gain and slope control ranges allowing you to set the levels required for the ultimate trip down the trunk line.

In the diagram below, one active combiner is married to a pair of passive combiners in a three-way splitter used "backwards" as a combiner. And, the pair of passive units are individually amplified (RMDA, WCA-40) and then their outputs combined using a hybrid design 3-way splitter with the output of the active combiner.

Isolation. Combining is the art of adding together separate channels without allowing any of these to interfere with any other channel in the system. You do this by keeping respective channel levels properly balanced, not using adjacent ports on a combiner for adjacent channels in the spectrum, and by maintaining "isolation" between input ports. A quality combiner will have 24 dB of isolation between ports; a number like 30 is better. In fact, you can combine two channels or two sets of channels (such as through two combiners) in a carefully selected (hybrid) 2-way splitter. Or 3 way or 4-way. It is absolutely essential that you know the *isolation* between splitter ports before selecting one for combining purposes - or,





be prepared to field trial a selection before choosing one for actual use (specs are difficult to locate on most splitters).

Which suggests a quick and not time consuming experiment (above). Unplug one of the existing 16 channel active combiner inputs, substitute a suitable high isolation 2-way splitter and combine two channels here (being selective not to use two adjacent in frequency channels through the external 2-way splitter). Because of the mixing loss, the two channels added in this manner will need to be cranked up about 4 dB to achieve the same level either channel would have if it were alone into the active combiner.

Summary

Combining starts at the input to the trunk (main out distribution) line and works backwards. Be careful not to arrange channels so that any individual modulator or processor is forced to run at maximum output to arrive at the trunk input at sufficient level. All of the bad (undesirable) beats and inter-mod products generated by these units occur typically in the last 6 to 10dB of output range. Keep everything turned down, don't skimp on gain blocks and select only gain blocks with low internal distortion products.

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 November 2000

Bird	Service	RF/IF &Polarity	# Program Channels	FEC	Msym	Receivers and Errata
I704/66E	Sky News +	3805/1345R	4	3/4	22(.520)	Sky News 24 hr, sport, feeds; **some FTA**
Ap2/76E	Hallmark	3720/1430H	4	5/6	29(.270)	PowVu, typ. CA; Kermit now gone
	Channel "I"	382301330V	1	3/4	3(.570)	Tests, FTA
	TVB8 +	3849/1301H	4	3/4	13(.238)	PowVu, CA
	AXN	3920/1230H	up to 8	7/8	28(.340)	Tests, promos, **ch 5 FTA**
Thcm3/78.5E	Sky Ch Aust	3666/1483H	up to 3	3/4	4(.340)	Now testing - new here
	Mega +	3640/1510H	12	3/4	28(.056)	Mega Cosmos here; new Sr
	Mahar/DD1	3600/1550H	up to 8	3/4	26(.661)	USA religion chs FTA
	TRT +	35511600H	4+ TV, radio	3/4	13(.330)	3 Angels USA, Ch of Hope, + 9 radio
	PTV2	3420/1730V	1	3/4	3(.366)	FTA, not seen Australia
	TV Maldives	3412/1738V	1	1/2	6(.312)	FTA (reaches SE Australia)
	Thai Global+	3425/1725V	up to 7?	2/3	27(.500)	FTA
Insat 2E/83E	**DD2**	3910/1240V	1	3/4	5(.000)	SCPC, testing MPEG-2; OK E. Aust.
	DD tests	3929/1221V	1	3/4	5(.000)	SCPC, weaker than 3910 above
ST1/88E	Taiwan Bqt	3509/1641H	13	3/4	23(.450)	MCPC, **sometimes FTA**, 2 adult chs
Yaml-102/90	**TV6 Bqt**	3645/1510L	3(+)	3/4	28(.000)	new Sr; unlikely south of eqtor
MeSt 1/91.5E	**Malay. TV3**	4147/1004H	1	3/4	7(.030)	CA but occ. FTA
As2/100.5E	**Euro Bouqt**	4000/1150H	6TV, 21r	3/4	28(.125)	FTA (TV5 teletext); now includes RTPi
	Reuters	3909/1241H	1	3/4	5(.632)	occasional feeds, **some FTA** MPEG2
	Hubei/HBTV	3854/1296H	1	3/4	4(.418)	FTA SCPC, teletext
	Hunan/SRT	3847/1303H	1	3/4	4(.418)	FTA SCPC, teletext
	Guan./GDTV	3840/1310H	1	3/4	4(.418)	FTA SCPC, radio APID 81
	In. Mongolia	3828/1322H	2	3/4	8(.397)	FTA: #1 Mongolian, #2 Mandarin
	APTN A-O	3799/1351H	1	3/4	5(.631)	mostly 4:2:2 SCPC (news feeds)
	WTN Jer/Lon	3790/1360H	1	3/4	5(.631)	Mostly CA; **some FTA**
	Reuters/Sing.	3775/1375H	1	3/4	5(.631)	**FTA** & CA
	WorldNt/US	3764/1386H	1 + 20 radio	3/4	6(.100)	FTA; up to 20 radio channels
	Liaonin/Svc2	3734/1416H	1	3/4	4(.418)	FTA SCPC, radio APID 256
	Jiangx/JXTV	3727/1423H	1	3/4	4(.418)	FTA SCPC, teletext, radio APID 81
	Fujian/SETV	3720/1430H	1	3/4	4(.418)	FTA SCPC, + radio APID 80
	Hubei TV	3713/1437H	1	3/4	4(.418)	FTA SCPC, radio APID 80
	Henan/Main	3706/1444H	1	3/4	4(.418)	FTA SCPC, + radio
	Egypt/Nilesat	3640/1510H	6+, radio	3/4	27(.850)	Thru TARBS Aust, subs now OK
As2/100.5E	**Feeds**	4086/1064V	1	3/4	5(.632)	FTA SCPC feeds
	TVSN	4033/1117V	1	3/4	4(.298)	Occ. **FTA**, not same as Aust. version
	Sky Racing	4020/1130V	up to 3TV	1/2	18(.000)	(Irdeto) CA; **1 & 3 occ. FTA**
	EMTV	4006/1144V	1TV, 2 radio	3/4	5(.632)	PowVu CA; poor signal level
	Jilin Sat TV	3875/1275V	1	3/4	4(.418)	FTA SCPC, + radio
	HeiLongJian	3834/1316V	1	3/4	4(.418)	FTA SCPC
	JSTV	3827/1323V	1	3/4	4(.418)	FTA SCPC, + radio
	Anhui TV	3820/1330V	1	3/4	4(.418)	FTA SCPC
	ShaanxiQQQ	3813/1337V	1	3/4	4(.418)	FTA SCPC, radio APID 81
	Guan/GXTV	3806/1344V	1	3/4	4(.418)	FTA SCPC, radio APID 257
	Fashion TV	3796/1354V	1	3/4	2(.533)	FTA SCPC, reload - changed PIDs
	MSTV	3791/1359V	1	3/4	4(.340)	FTA SCPC
	Myawady	3766/1384V	1	7/8	5(.080)	FTA SCPC - difficult to load
	SABe	3742/1408V	1	3/4	3(.300)	SCPC - now regular programming
	Saudi TV1	3660/1490V	1 (?)	3/4	27(.500)	FTA MCPC
As3S/105.5E	Zee bouquet	3700/1450V	9TV	3/4	27(.500)	Mediaguard CA, **ch 8 FTA**
	ETV Bangla.	3749/1401V	1TV	3/4	4(.340)	PowVu but FTA at this time
	Arirang TV	3755/1395V	1	7/8	4(.418)	FTA SCPC; audio problems (see p. 29)
	Now TV	3760/1390Hz	2	7/8	26(.000)	also check 3900/1250Vt, same #s
	Star TV	3780/1370V	17(+)TV	3/4	28(.100)	NDS CA (Pace DVS211, Zenith)
	Star TV	3860/1290V	14(+)TV	3/4	27(500)	NDS CA (Pace DVS211, Zenith)
	Star TV	3880/1270H	12(+)TV	7/8	26(.850)	NDS CA (Pace DVS211, Zenith)
	CNNI	3960/1190H	4(+)TV	3/4	26(.000)	PowVu CA; some **FTA** feed channels
	Star TV	4000/1150H	7(+)TV	7/8	26(.850)	NDS CA (Pace DVS211, Zenith)
	Sun TV	4095/1055H	1	3/4	5(.554)	"History Channel" testing SCPC
	CCTV bqt	4115/1035H	4(+) TV	3/4	19(.850)	was analogue; now FTA MCPC
	Zee Bqt #2	4140/1010V	4(+) TV	2/3	15(.000)	New test bouquet; service erratic
Cak1/107.5E	Indovision (S-band)	2.536, 2.566, 2.596, 2.626	33(+) TV	7/8	20(.000)	NDS CA using RCA/Thomson, Pace IRDs
C2M/113E	**TPI**	4185/965V	1	3/4	6(.700)	FTA SCPA; NT only
	News Asia	4071/1079H	1	3/4	14(.043)	May only be test; NT+Asia only?
	Anteve	4055/1095V	1	3/4	6(.510)	FTA SCPC; NT only
	Space TV	4000/1150H	11TV, radio	3/4	26(.666)	CA, sometimes **FTA**
	C Net Taiwan	3760/1390H	11TV, radio	3/4	26(.666)	CA, subs available **-10 radio** typ. **FTA**

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	Receivers and Errata
(C2M/113)	**RCTI**	3475/1675H	1	3/4	8(.000)	FTA SCPC, Australia OK
JcSat3/128	Miracle Net	3990/1160V	3 up to 6	5/6	22(.000)	PowVu, some **FTA** (1,3)
	Asian bqt	3960/1190V	up to 8	7/8	30(.000)	CA & **FTA** Ntsc: Japan, Taiwan
MeaSat 2	Astro Mux	11.478H (+)	up to 7TV	7/8	30(.000)	Aust east coast beam; also 11.664Hz
	Mediasat	11.540Hz	1+TV, tests	5/6	30(.800)	regular operation shortly
Op B3/156	Mediasat	12.336V	5TV, 3ra, Inter.t	2/3	30(.000)	CA, **some FTA, Herbalife**
	Aurora	12.407V		2/3	30(.000)	cvrs Aust, NZ 90 cm; CA
	Aurora	12.532V	Inc Zee, ATV	2/3	30(.000)	cvrs Aust, NZ 90 cm; CA
	Aurora	12.595V		3/4	30(.000)	CA, $105 smart card required (p. 28)
	Aurora	12.720V		3/4	30(.000)	CA, $105 smart card required (p. 28
	Austar/tests	12.376H		3/4	29(.473)	Austar I-TV tests
	Austar/Foxtl	12.438H		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.564H		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.626H		3/4	29(.473)	CA, subscription available Australia
	Austar/Foxtl	12.688H	(some FTA ra)	3/4	29(.473)	CA, subscription available Australia
Op B1/160	**ABC NT fd**	12.256V	1TV, 3 radio	3/4	5(.026)	FTA, Sydney -30 minutes time zone
	Central 7	12.354H	1TV	3/4	3(.688)	FTA, purpose here unknown
	News feeds	12.367H	1	3/4	5(.424)	FTA; Imparja
	Sky NZ	12.519/546V	7TV/7TV	3/4	22(.500)	NDS CA, subscription available NZ
	Sky NZ	12.581/608V	6TV/6TV	3/4	22(.500)	NDS CA, subscription available NZ
	Sky NZ	12.644/671V	9TV	3/4	22(.500)	NDS CA, subscription available NZ
PAS8/166	**ABCInterch**	12.312H	1	3/4	6(.978)	PowVu, FTA, news feeds
	ABCInterch	12.321H	1	3/4	6(.978)	PowVu, FTA, news feeds
	ABCInterch	12.330H	1	3/4	6(.978)	PowVu, FTA, ABC Melbourne feeds
	TARBS	12.526H	12+ TV	3/4	28(.067)	TPG /Eurodec CA, occ. FTA
	TARBS2	12.606H	6+TV	3/4	28(.067)	Tests, inc. ESPN, see TARBS above
	JEDI/TVB	12.686H	11+ TV	3/4	28(.124)	Irdeto CA, **some FTA** tests
	Boomerang	12.725H	5 TV	7/8	25(.728)	CA, subscriptions avail Australia
	NHK Joho	4065/1085H	6TV, 1 radio	3/4	26(.470)	PowVu CA & **FTA**; subscription avail
	ESPN USA	4020/1130H	7+TV, data	7/8	26(.470)	PowVu CA; ch 11 DCP-CCP bootload
	Discovery	3980/1170H	8 typ.	3/4	27(.690)	PowVu/CA (some audio **FTA**)
	CalBqt/Pas8	3940/1210H	up to 8TV	7/8	27(.690)	PowVu CA & **FTA (EWTN/EB Net)**
	CNBC HK	3900/1250H	up to 7TV	3/4	27(.500)	FTA at this time
	Filipino Bqt	3880/1270V	up to 9 TV	3/4	28(.700)	Some **FTA**; also 4040V, 27.686,7/8
	Feeds	3854/1296H	1	3/4	6(.110)	occ. feeds, inc. Mediasat Sydney
	Lakbay TV	3813/1337V	1	3/4	5(.044)	(Filipino) sometimes **FTA**; PowVu
	CNNI	3780/1370H	3, up to 5 TV	3/4	25(.000)	PowVu, FTA at this time
	MTV	3740/1410H	8	2/3	27(.500)	CA; #7,8 **FTA feeds**
PAS2/169	Pv Bouquet	12.290V	2+ TV, radio	2/3	27(.500)	PowVu CA, WIN, ABC NT
	WA PowVu	12.637(.5)V	4TV, 8 radio	1/2	18(.500)	PowVu CA, WA only - D9234
	HK PowVu	4148/1002V	up to 8	2/3	24(.430)	PowVu CA; some **FTA**
	Fox Bouquet	3992/1158V	8TV/data	7/8	26(.470)	Pv, CA/FTA (**FTA ch 3 only**)
	Feeds	3934/1216V	1	3/4	10(.850)	PowVu (FTA) occ. feeds
	Feeds	3929/1221V	1	3/4	10(.317)	Mediasat links, 7th Day Adv. feeds
	Feeds	3912/1238V	1	2/3	6(.620)	PowVu(FTA) occ. feeds
	Feeds	3898/1252V	1	2/3	12(.000)	(PowVu) FTA, occ. feeds
	Feeds	3812/1338V	1	3/4	6(.620)	PowVu (FTA) occ feeds
	Middle East	3778/1372V	4	3/4	13(.331)	FTA, testing CA, "threatening"
	BBC +	3743/1407V	3	3/4	21(.800)	**BBC FTA**, others CA usually
	CCTV Pv	3716/1434V	5 typical	3/4	19(.850)	PowVu FTA; # pgm chs varies
	Feeds	4138/1012H	1	3/4	6(.620)	FTA SCPC/MCPC, news and sports
	7thDyAdv	3872/1278H	1TV, 4+ audio	3/4	6(.620)	Sat, Sun 0930 UTC typ.
	CNNI HK	3996/1154H	1	3/4	9(.998)	reverse link HK/Atlanta, feeds, FTA
	Mbc/Korea	3981/1169H	1	3/4	2(.982)	FTA SCPC, now 24 hour
	Feeds	3868/1182H	1	2/3	6(.620	FTA (occ. sport feeds)
	Feeds	3939/1211H	2 (typ NTSC)	2/3	6(.620)/7(.498)	FTA-typ. NTSC-occ. sport, shuttle
	Cal PowVu	3901/1249H	up to 8	3/4	30(.800)	(PowVu) CA+**FTA**
	Feeds	3854/1296H	1	2/3	6(.620)	(PowVu) occ. feeds
	Disney	3804/1346H	3	5/6	21(.093)	PowVu CA
	Satcom 1-6	3743/1407H	up to 5	7/8	19(.465)	currently FTA, lowlevel, Mid East fds
I702/177E	AFRTS	4177/973LHC	8TV, 12+ rad	3/4	26(.694)	PowVu CA
I701/180E	**TNTV**	11.060V	9	3/4	30(.000)	Testing new pay-TV service, east beam
	Tele Fenua	11.168V	4	3/4	10(.100	Tests, may be off
	Canal+ Sat	11.610H	16TV, 1 radio	3/4	30(.000)	Mediaguard CA, one **FTA**

Bird	Service	RF/IF & Polarity	# Program Channels	FEC	Msym	Receivers and Errata
(I701/180E)	TVNZ	4195/955RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/BBC	4186/964RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ	4178/972RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/Aptn	4170/980RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	TVNZ/feeds	4161/989RHC	1	3/4	5(.632)	DMV/NTL early version, occ feds, typ ca
	RFO-Canal+	4086/1064L	4TV, radio	5/6	13(.347)	east hemi 20.5 dBw, to be 15.5 soon
	TVNZ/feeds	4052/1098RHC	1	3/4	5(.632)	DMV/NTL early version,occ feds, typ ca
	TVNZ feeds	4044/1106R	1	3/4	5(.632)	SCPC, mixed CA and **FTA** feeds
	NZ Prime TV	4024/1126L	1	2/3	6(.876)	PowVu CA; Auckland net feeds
	NBC to 7 Oz	3960/1190R	1	7/8	6(447)	CA, Leitch encoded
	Ioarana	3772/1378L	1	3/4	4(.566)	FTA SCPC; East Hemi Beam-Tahiti
	TVNZ	3846/1304R	1	3/4	5(.632)	SCPC, mixed CA & **FTA**, feeds
	10 Australia	3765/1385R	6	7/8	29(.900)	PowVu CA & **FTA: #3 TBN**

BOUQUETS - FTA vs. CA: FTA (free to air) services appear as SCPC (single channel per carrier) and within MCPC (multiple channels per carrier). FTA services here are shown **bold face**, when FTA is occ(asional) or only for a portion of MCPC bouquets, **bold face** appears in right hand column. PowVu stands for Scientific Atlanta PowerVu which is accessible even when FTA only when the IRD has been software-designed to process SA's unique version of MPEG-2. SA IRDs, such as D9223, can be equipped with MPEG-2 standard or may only be capable of receiving SA's version of MPEG-2, even for FTA services. SA offers an over-the-air software update for existing non-MPEG-2 versions of the receiver (see bottom of this page). Not all receivers automatically receive MPEG-2 transmissions which have variations of the MPEG-2 software "standard." PID numbers are discussed in our web site (http://www.satfacts.kwikkopy.co.nz). Not all IRDs can deal with PID entry - virtually all 1999 and 2000-new models will do this (PID numbers can be found at http://www.lyngsat.com/. In tables, "# Programme Channels" indicates the total number of video the IRD should load if you load the bouquet.

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

ADI MediaMate. FTA, NTSC+PAL outputs. (Pacific Digital Sys. Pty Ltd, tel 61-2-8765-0270)
AV-COMM R3100. FTA, excellent sensitivity (review SF May 1998); new version Sept. '99. Av-COMM Pty Ltd, 61-2-9949-7417.
Benjamin DB6600-CI. FTA, Foxtel/Austar w/CAM+card. Autosat Pty Ltd 61-2-9642-0266 (review SF#72)
Grundig DTR1100. Mfg by Panasat (SA), very similar to Panasat 630; out of production, Irdeto capable. See Av-COMM above.
Humax F1-CI. Primarily sold for TRT(Australia), does (limited) PowerVu (not Optus Aurora approved).
Humax ICRI 5400. Embedded Irdeto + 2 CAM slots; initial units have NTSC glitch. Widely available.
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, 61-7-4788-8906.
Hyundai HSS800CI. FTA, Irdeto (with CAM) + other CA systems, PowerVu, NTSC. Kristal Electronics, above; review SF#63.
MediaStar D7. FTA, preloaded w/ known services, exc. software (review SF July 1998). MediaStar Comm. Int. 61-2-9618-5777
MediaStar D7.5. New (May 00) single chip FTA; review June 00 SF. MediaStar Comm. Int. 61-2-9618-5777
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- Note: This site shut-down by Mindport).
Nokia 9500/9600. Numerous versions for different world parts; not distributed in Pacific but assistance from Av-Comm Pty Ltd.
Nokia 9800. Latest single chip version, with CI and Irdeto capable. No software for Pacific, Asia; not recommended.
Pace DVS211. NDS CA (no FTA) for Star Asia, previously used for Indovision. (Solution 42, 61-2-9820-5962)
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.
Pacific Satellite DSR2000. Advises no longer current model (see. p. 2, here); Clone of Mediastar D7 (see above)
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 no longer 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)
PowerCom. FTA, PowVu, NTSC, excellent sensitivity. NetSat 61-2-9687-9903.
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.
Praxis 9800 ADP. FTA SCPC/MCPC, PowVu, analogue, positioner. SF review Dec '98; withdrawn from Pacific sale (below).
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 61-2-6292-5850, Telsat 64-6-356-3749)
SatCruiser DSR-201P. FTA SCPC/MCPC, PowVu, NTSC/PAL, analogue, positioner - review this issue (Skyvision - see above).
Skandia SK888 (aka DigiSkan-SMS). FTA MCPC, Irdeto CAM+software upgrade. Out of production; Skandia 61-3-9819-2466
Strong SRT 4600. SCPC, MCPC, PowerVu; exc graphics, ease of use, review SF#64. SATECH 61-3-9553-3399.
Sky 21/SJ 3000ci. Claims "clone" Hyundai HSS800ci; if so, poor copy. Runs very hot, reportedly burns up smart cards
UEC642. Designed for Aurora (Irdeto), approved by Optus; limited other uses. Nationwide 61-7-3252-2947.
UEC660. Upgraded UEC642, used by Sky Racing Aust., Foxtel-limited FTA. (Nationwide - above); power supply problems.
UEC700/720. Single chip Irdeto built-in design for Foxtel; unfriendly for FTA. Power supply problems, seldom sold to consumers.
Xanadu. DVB compliant special receiver for members of SPACE Pacific (Av-comm Pty Ltd, tel +61-2-9949-7417)
Yuri HSS-100C. FTA, clone of Hyundai, V2.27 software custom to Australia (Nationwide-above).

Accessories:

Aurora smart cards. New v1.6 now available, 1.2 no longer available for RABS. Price now A$105, Sciteq 61-8-9306-3738.
PowerVu Software Upgrade: PAS-8, 4020/1130Hz, Sr 26.470, 7/8; pgm ch 11 and follow instructions (do not leave early!)

SatFACTS Pacific/Asian FTA ANALOGUE Watch: 15 November, 2000

BIRD/ Location	RF/IF & Polarity	Service	Errata
I703/57E	3808/1342R	Udaya TV	
	4052/1098R	WorldNet	VOA subcrs.
	4178/972L	MTA Inter.	
I604/602/60E	4166/984	various feeds	
I704/66E	3765/1385R	tests	
	4015/1135L	Mongolia	(SECAM)
PAS4/68.5E	3743/1407V	RTPi	(+ radio subcr)
	3864/1286V	BBC World	
	3907/1243H	Sony TV	Hindi
	4034/1116V	Doordan	(various)
	4087/1063H	CNNI	
	4110/1040H	TNT/Cartoon	
	4113/1037V	Series Ch.	
	4182/968H	MTV	
PAS7/68.5E	3470/1680V	test signal	
LM1/75E	3980/1170V	various	(Madagascar)
ApStar 2R	3780/1370H	TV Malagasy	(SECAM)
Thaicom3/78E	3871/1279H	TVT	
	3760/1390V	Army TV	
	3685/1465V	MRTV	hot to NSW
	3685/1465H	VTV	6.6, 7.02
	3616/1534V	ATN	
	3576/1574V	ATN Bangalr	Bengali
	3554/1596V	test card	
	3536/1614V	Punjabi TV	(occ service)
	3507/1643V	RAJ-TV	
	3489/1661H	Vasta Music	occ tests
	3465/1685V	RAJ-TV	
Expres 6A/80E	3675/1475R	RTR	(global beam)
InSat 2E/83E	3481/1669V	Sun TV	
	3562/1588V	Vijay/Asianet	aud. 5.5/6.6
	3599/1551V	JayaTV	
	3810/1340V	DD1-Tamil	"
	3850/1300V	DD1-National	"
	3930/1220V	DD2 Metro	"
	3970/1180V	Teluga 1	"
	3998/1152V	sport feeds	"
	4035/1115V	Sun TV	"
	4060/1090V	Surya/Sun TV	"
	4093/1057V	DD7	"
ChnStr1/87.5E	3880/1270H	occ feeds/ card	P4 NSW, Ntsc
ST1/88E	3550/1600V	test card	
	3582/1568V	Nila TV	(vintage TV)
Yamal 102/90E	3675/1475R	RTR1	P3 NSW
	3875/1275R	Orbita 1	
	3916/1234R	RTR II	
	3935/1215R	Orbita II	
MeSat-1/91.5E	3710/1440H	VTV1,2, 4	
	3880/1270H	RTM-1	
Gz 28/96.5	3675/1475R	RTR	inc +/- 3.7
Chinasat22/98	3900/1250H	tests	+ 3940/1210
InSat 2B/93.5E	4165/985H	India Metro	NSW on 3.7m
	4080/1070V	DD7 (Tamil)	
	4070/1080H	DD9	
	3970/1180V	DD9 (Kan.)	
	3882/1268V	DD1	
	3840/1310V	DD?	
	3762/1388V	DD4	
AsSat2/100.5E	3660/1490V	feeds, tests	
	3680/1470H	feeds	
	3860/1290V	feeds	

BIRD/ Location	RF/IF & Polarity	Service	Errata
(As2/100.5E)	3885/1265H	WorldNet	VOA subcrs
	3980/1170V	RTPi	(radio gone)
Exp. 9/103E	3675/1475R	RTR	inc +/- 2.1
	3875/1275R	Vrk Apt	
As3S/105.5E	3640/1510H	Asia Plus	China, 6.6
	3660/1490V	Urdu TV Net	6.6, 7.2 audio
	3680/1470H	CETV	
(temp FTA)	3800/1350H	Star Sport	NTSC
(temp FTA)	3840/1310H	Channel [V]	NTSC
(temp FTA)	3920/1230H	Phoenix Ch	NTSC
	3940/1210V	Zee India	(to shut down)
	3980/1170V	Zee TV	(to shut down)
	4020/1130V	Sahara TV	6.2, 6.8
	4100/1050V	PTV2/World	
T'kom1/108E	4000/1150H	tests	
PalapC2/113E	4160/990H	(France) TV5	
	4140/1010V	Brunei + feeds	
	4120/1030H	MTV Asia	
	4080/1070H	Herbalife	+ tests
	4040/1110H	CNBC	
	3970/1180V	CNNI	
	3920/1230H	CNNI	tests
	3880/1270H	Aust ATN7	
	3840/1310H	TVRI	tests
	3742/1408V	RCTI	English subcr
AsSat1/122E	3677/1473V	Test card	3933/1217H
ChinS 6/125E	4085/1065V	feeds	seldom seen
JcSat3/128E	3768/1382V	feeds	occ., P5 NZ
	4085/1065V	test card	NTSC. 6.8
Ap1A/134E	4160/1050V	CETV	
	3980/1170V	CETV1	
	3900/1250V	CETV2	
Ap1A/138E	4160/990H	CCTV7	
G25/140E	3675/1475R	ORT Moscow	inc. +/- 4.9
	3875/1275R	feeds, tests	
LMAP2/142.5	3675/1475L	occ. tests	+/- 3 deg inc.
Gorizont 33	3675/1475R	tests	+/- 1.2 deg inc
	3875/1275R	RTR	audio 7.5
Ag2/146E	3787/1363H	GMA	P1/2 s. eqtr
Me2/148E	4080/1070H	test card	occ. use
PAS8/166.5E	3880/1270V	test card, feeds	not full time
	3865/1285H	Napa test card	not fulltime
PAS2/169E	3940/1240V	Napa test card	
SpNet4/172E	4199/951H	test carrier	may be beacon
1802/174E	4166/984R	Feeds	
	4177/973R	Feeds	
I702/176E	4166/984R	Feeds	from 177E
	4187/963R	Occ. feeds	
I701/180E	4187/963R	Occ. feeds	
	3841/1309L	RFO	East Beam
	3845/1305R	Occ. feeds	inc. from USA
	3930/1220R	USA net feeds	**FTA** & ca
	3975/1175R	Occ. feeds	

PAS4/68.5E	3785/1365V	Discovery India	BMAC
	3860/1290H	ESPN India	BMAC
Ap2/76E	3960/1190H	HBO Asia	GI Digicipher2
C2/113E	3930/1220H	Filip. Peo. Net	GI 1.5 MPEG
Ap1/138E	4100/1050V	ESPN	BMAC

UEC 642 - Making it work outside of Aurora

TO LOAD: Optus B3 pay TV with AURORA and Mediasat on a UEC642

(Assuming the IRD is originally set to work on Aurora, and is attached to a dual-polarity LNB, with enough signal from the pay-TV transponders at the location.)

1) Set to Aurora TV channel 1 and leave on that channel for at least 3 minutes; **2)** press the "MENU" button; **3)** select "Advanced Options"; **4)** press the "OK" button; **5)** press the "OK" button a second time; **6)** enter the pin code: 9949; **7)** select "Change Manual Tuning parameters"; **8)** press the "OK" button

9) enter the following settings: Frequency - 12.438; Symbol rate - 29.473; Polarisation - Horizontal; FEC - ¾

10) press the "OK" button; **11)** select "Tune & Rescan"; **12)** press the "OK" button

The IRD should start to load the pay TV channels. When the TV screen changes from the blue-bordered "scanning" display, watch the LED display on the IRD. It should first indicate "1," and after a few seconds should change to a "2." When this occurs, all of the pay TV channels are loaded.

13) Watch the TV screen again and press the "TV" button repeatedly until "5 of 5 Public Bouquet" appears at the top of the screen.

14) Quickly press the "OK" button; "E37 service unknown" should appear on the TV screen

15) press the "menu" button; **16)** select "Advanced Options"; **17)** press the "OK" button; **18)** select "signal detection"; **19)** press the "OK" button; **20)** Press the "OK" button a second time; **21)** Select "Change dish installation"; **22)** Press the "OK" button; **23)** enter the pin code: 9949; **24)** select "Change Manual Tuning Parameters"; **25)** press the "OK" button; **26)** enter the following settings: Frequency - 12.407; Symbol rate - 30.000; Polarisation - vertical; FEC - 2/3; **27)** press the "OK" button; **28)** press the "Menu" button.

AURORA should now start to load. When the scanning is complete, the IRD display should indicate "1."

29) Check that there are 69 TV and 66 radio channels (as a minimum); sometimes the "ABC RR SE" will not load. If all of the channels won't load - you need to reset to factory defaults and then begin at step 1 again. To reset to factory default:

a) press the "Menu" button; **b)** select "Advanced options"; **c)** press the "OK" button; **d)** press the "OK" button a second time; **e)** enter the pin code 9949; **f)** select "Reset to factory defaults"; **g)** press the "OK" button; **h)** press the "OK" button a second time. The IRD should now load the factory default settings; then reload Aurora and start over.

30) set to Aurora channel 1; **31)** press the "menu" button; **32)** select "Advanced options"; **33)** press the "OK" button; **34)** select "Signal Detection"; **35)** press the "OK" button; **36)** press the OK" button a second time; **37)** select "Change dish installation"; **38)** press the "OK" button; **39)** enter the pin code: 9949; **40)** select "Change manual Tuning Parameters; **41)** press the "OK" button; **42)** change the frequency setting to 12.336; **43)** press the OK" button; **44)** press the "Menu" button - Mediasat should now load.

45) Check that there are now 74 TV channels and 70 radio channels (as a minimum); if there are not, see a) to h) instructions after 29) above.

To access AURORA channels: **1)** Insert the Aurora card, **2)** press the "TV" button repeatedly until "5 of 5 public bouquet" appears at top of screen; **3)** quickly press "OK" button; **4)** select the radio or TV channel in the usual manner (channel numbers have not changed from original Aurora-only settings)

To access Mediasat: If starting from Aurora, you will find the Mediasat channels AFTER the full Aurora list. If starting from a pay TV bouquet: **1)** press the "TV" button repeatedly until "5 of 5 Public Bouquet" appears on the screen; **2)** quickly press the "OK" button; **3)** select the Mediasat TV or radio channel in the usual manner

To access TVSN (FTA within pay-TV package): If on Aurora or Mediasat, **1)** press the "TV" button repeatedly until "1 of 5 DTH" appears on the screen; **2)** quickly press the "OK" button; **3)** select channel 29 (only needs to be done one time, channel 29 will be stored in memory as "DTH")

To access Austar: **1)** press the "TV" button repeatedly until "3 of 5 Austar appears on the screen; **2)** quickly press the "OK" button; **3)** insert the Austar card; **4)** select the TV or radio channels (channel numbers typically are the same as with a Pace DGT 400 IRD).

Note: If the IRD is left on a channel for about 3 minutes or longer prior to changing services, it is stored in memory, so that when you return to the service, you return to that channel.

TUNING IN THE INDUSTRY'S TV PROGRAMME

SPACE Pacific, the Asia-Pacific industry membership trade association, has produced (and continues to produce) a series of one hour television programmes. These "SPACE Pacific Report" shows, hosted by Bob Cooper, cover a range of topics of interest to installers and enthusiasts. Show numbers and content are as follows: **#9901-** Spectrum Analyser techniques, **#9902-** Feeds and LNBs, **#9903-** Dish antenna designs and problems, **#9904-** The dish marketplace, and, "tiny parts," **#9905-** Dr Overflow (Nokia) software, **#9906-** How the uplink works (tour of RCA's Vernon Valley site), **#9907-** Uplink Two, including uplink transmitters, **#9908-** Digital Basics (Mark Long), **#9909-** Real World Installs (Mark Long), **#9910** - Installing a polar mount dish and signal level test equipment, **#9911** - "SPIN" (the hidden side of satellite). **#0012** - First Report from SPRSCS 2000 (recorded in Melbourne June 28, 29 - "Ideal IRDs," more), **#0013** - Second Report from SPRSCS 2000 (recorded in Melbourne June 29, 30 -"ABA Blackspot session"), **#0014** - Naughty Nokia from SPRSCS 2000; **#0015** - The DVB-T Tangle from SPRSCS 2000 (Eric Fien). "Report" is broadcast by Mediasat on Optus B3, 12.336Vt, ad-hoc channel 3(*) (Sr 30.000, FEC 2/3) with the coming-weeks schedule: **Sunday November 19** - Show 9909, 0200-0300 UTC (1500 NZST, 1300 AEST, 1000 Western Australia; repeats 0700 UTC/7PM NZT, 6PM Sydney, 3PM Perth). **Sunday November 26** - Show 9910, repeats same time as November 19; **Sunday December 3** - Show 9911, repeats same time as November 19; **Sunday December 10** - Show 0012, same times as November 19; **Sunday December 17** - Show 0013, same times as November 19; **Sunday December 24** - Show 0015 (Premiere Showing), same times as November 19. (* - Mediasat may pre-empt showings, check other bouquet channels - such as 5 - if not on 3.) SPACE Pacific Report has also been broadcast by Westlink, Aurora service on Optus B3, vertical (12.595, Sr 30.000, FEC 3/4 - requires Optus Aurora card but is otherwise FTA). Westlink will again carry SPACE Pacific Report when new shows currently in planning are produced and available; details here in future issue (will start after January 1). In the event of schedule changes (*), SPACE Pacific attempts to pre-announce which show(s) will appear through the SatFACTS Web site prior to each weekend (http://www.satfacts.kwikkopy.co.nz). SPRSCS 2000 sessions taping scheduled for play on Mediasat and Westlink are currently in "editing production" for presentation which started in September. Sponsorship of SPACE Pacific Report. In general answer to queries - Av-Comm, Satech and Sciteq have contributed corporate funding to make possible the production of the first set of nine SPACE Pacific Report programmes.

WITH THE OBSERVERS

AT PRESS DEADLINE

David Leach (NSW) finds "strong carrier" on 955 L-band from SpaceNet 4 (see reports here) while Laurie Mathews (Auckland) finds it "P3-P4." This one *could* surprise us. And Leach suggests checking 3695/1455Hz/RHC from 72E where an aged Intelsat is inclined orbit. He also reports ex-Express 9 now at 103.2E no longer seems to be operating, at least south of the equator.

ApStar 2R/76E: TV Malagasy reported on 3780/1370Vt, SECAM FTA.

AsiaSat 2/100.5E: "TARBS package 3640/1510Hz loads on UEC642 while strangely Euro Bouquet does not." (**AI**, Qld.) "Malaysian GP Racing seen 4095/1055Vt, Sr 5.632, 3/4." (**Bill Richards**, Australia)

AsiaSat 3S/105.5E: Preparing to close down analogue services? Zee TV News on 4140/1010Vt (Sr 15.000, 2/3); ZED TV also here testing (VPID 32, APID 33). Zee Music in and out of CA on 3700Vt, Sr 27.500, 3/4. NOW-TV is cutting back on funding, changing business plan, may change on-air content (3760Hz, Sr 26.000, 7/8).

Intelsat 701/ 180E: "Can anyone determine the service and detail on 12.522.6, believed Hz, Sr in region of 25.000? Supposed to be Spot Beam S2 and uplinked from 'Brooster Uplink Canada', level here 40 dBw but cannot do Sr search to obtain content detail." (**S. Holzt**, New Caledonia). "Several TVNZ services noted: 4044/1105 RHC, 4052/1098RHC, 4161/989RHC, 4178/972RHC including soccer matches." (**Jacko**, NSW)

Intelsat 702/176E: This satellite completed 1 degree move from 177E on 30 October; reset your dish tracking memory.

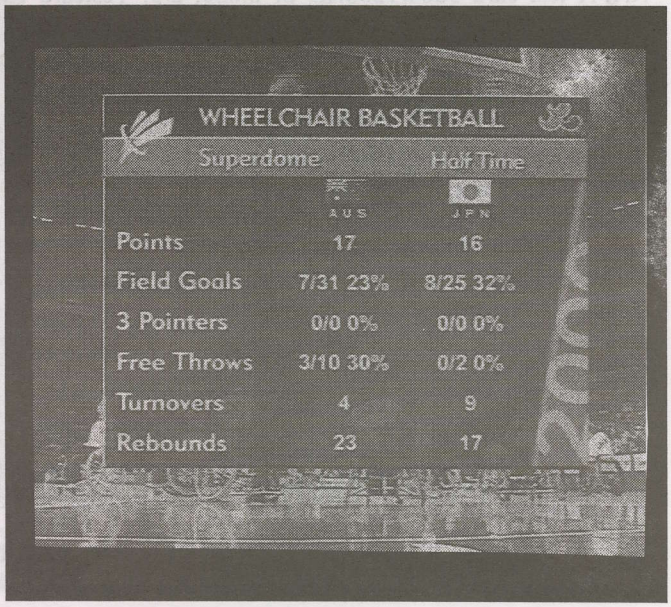
LMI 1/130E: It won't do you much good but you can vent your anger over loss of NTV/THT by faxing Russia at ++7-095-513-69-70. or Email tv@gazcom.net.ru.

Measat 2/148E: Mediasat 11.540 MUX is now FEC 5/6 (Sr 30.800).

Optus B1/160E: Citing software implementation difficulties, Sky NZ has set back launch of "Interactive" (OpenTV) format until first quarter of 2001 - was scheduled September-October. New for Sky - Playboy service on 12.671 transponder.

Optus B3/156E: "Asian TV's 2 channels scheduled to grow to six November 15th including Australia created Indian programming, have been renamed 'Reminiscent TV' on 12.532Vt Aurora." (**L. Mathews**, Auckland) "Only transponders not digitally loaded are T9 12.319Hz, T1 12.277Vt, T4 12.482Vt and T7 12.658Vt; T12 12.503 now loads with Sr 29.473, 3/4." (AI, Qld.)

Palapa C2M/113E: "3985/1215Hz, Asialink feeds, Sr 5.632, VPID 308, APID 256. Indovision or Star has restarted 3500/1650Hz 17 channel CA package, Sr 26.850." (Jacko, NSW) "ATVI analogue service, without audio, seen testing in FTA MPEG 4089/1061Hz, Sr 14.060, 3/4; VPID 512, APID 650. Australia says they have no knowledge of this, have not authorised." (**DW**, Hong Kong) Occ feeds reported 3897/1253Hz, Sr 3.000, 2/3.



Satellite had it. The Australian-hosted Para-Olympics provided modest but daily satellite coverage and you had to but check http://www.satfacts.kwikkopy.co.nz to learn where to look. Below, C7's special summer Olympics coverage wishes viewers adieu at closing of Sydney games.

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 December15th issue: December 4 by mail (use form appearing page 34), or 5PM NZST December 5th if by fax to 64-9-406-1083 or Email skyking@clear.net.nz.

PanAmSat PAS2/169E: Occ Spanish language services fed 4054/1096Hz, Sr 6.620, 3/4. "TBS News Service for Asia and Oceana on 3802/1348Vt, Sr 6.620 with news clips at 1700 AEST. Also 3812/1338Vt, Sr 6.620 loads as 'JT & Others'." (Jacko, NSW) "Korea's MBC is now 24 hours, FTA, 3981/1169Hz, Sr 2.982, 3/4 - VPID 3601, APID 3605. Tennis feeds on 3854/1296Hz, Sr 6.200, 2/3. WWF Wrestling feeds, 3860/1290Hz, Sr 12.208, 2/3 VPID 4096, APID 4097 but in MPEG 4:2:2. Asian feeds 3868/1282Hz, Sr 10.998, 2/3; NAPA test card 3864/1286Hz, Sr 6.620, 2/3. Testcard FTA 3929/1221Vt, Sr 10.317, 3/4. Cricket feed 3961/1189Vt, Sr 5.632, 3/4. RTL Malaysia sport feeds 4027/1123Hz, Sr. 20.000, 3/4." (Bill Richards, Australia) "IHUG has changed to 12.480Vt , Sr 19.443." (**S. Johnson**, NZ)

PanAmSat PAS8/166.5E: "ABS-CBN left 3800Vt using Digicipher 1, moving to 3880/1270Vt, now using PowerVu and D9225 - briefly FTA." (**G. Welsby**, PNG) "Lakbay TV - Filipino - has changed parameters; now 3813/1337Vt, Sr 5.044, 3/4 VPID 4096, APID 4097." (**AK Weller**, PNG) Country Music Television is now 'Music Country' - same service, new name, slightly increased Australian content (3940/1210Hz, Sr 27.690, 7/8).

SpaceNet 4/172E: May be a beacon, may be a low level CW (non modulated) carrier. First reported around 4195, then 4198.5Vt, finally 4199.5Hz. (**David Pemberton**)

Thaicom 3/78.5E: Sky (racing) Channel scheduled to start here on 3685.5, Sr in 4.000 range, 3/4 November 15th - will continue to feed parallel on As2 (4020Vt) until January 1. EIRP will drop down for most users, 25 to 265 dBw in PNG, Hong Kong.

Yamal 102/90E: Symbol rate for Gazcom MUX on 3645/1505LHC is now 28.000.

Errata: Want to see pictures of 700 home style dishes all phased together for SETI observation? Check http://www.seti.org/general/rpa_pr/pages/RPAFar.htm. Rumour of the month: PanAmSat is acquiring certain Optus assets including Aurora project, might move all Aurora transponders to a PAS (2 or 8) Ku bird. "Finally got my SA D9223 to load new CMT software. Trick was to press ALT then CHAN UP/CHAN DWN for factory reset. Then load the bootloader fresh into receiver. New CCP software is ver 2.40 and DCP is 2.31." (**J. McLean**, NZ). Most popular new IRD? Humax IRCI 5400 now carried by Sciteq, Kristal, Av-Comm and Skyvision - we review it in December issue. ABA announced (October 16) "new digital pay-TV licenses"" awarded to Access 1 (30 channels) and TPG (Boomerang - 20 channels).

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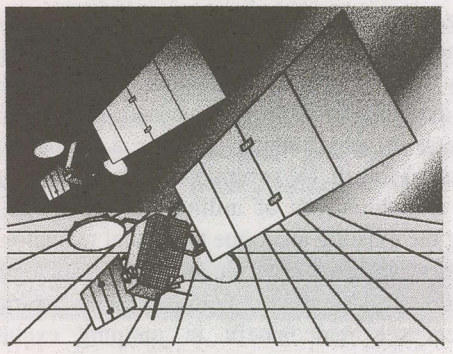

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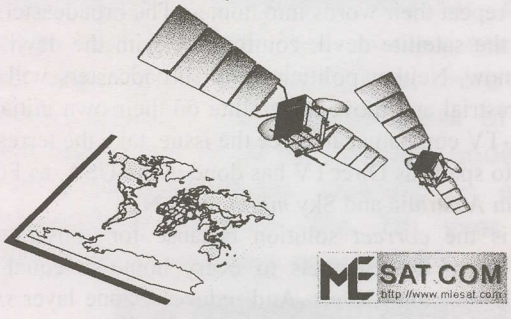


AT Sign-off

Once in a lifetime opportunity

Coop's Technology Digest for October 26th reports on a plan to turn off all New Zealand terrestrial TV transmitters, converting all terrestrial (analogue) services to satellite and digital. The only practical impediment to the proposal seems to be Sky New Zealand's reluctance to "share" its (NDS format) conditional access system with terrestrial broadcasters, thereby making possible a single set-top box (IRD) solution for *all* TV reception in the country.

Faced with hundreds of millions of dollars to be spent converting the existing analogue terrestrial to analogue digital and the uncertainty of how much existing analogue service areas will shrink with digital format transmissions, broadcasters see real benefit in jumping exclusively to satellite for all TV (and radio) services.

Ku-band pay-TV in the USA discovered one year ago the attraction to consumers to have *all* of their TV coming in via satellite. Laws were changed and new regulations adopted permitting satellite viewers to receive not only their 100-200-300-400-500 channels of pay-TV via satellite, but their local "network affiliate" services as well. The placard (right) from a Los Angeles chain store announces this new availability in Southern California.

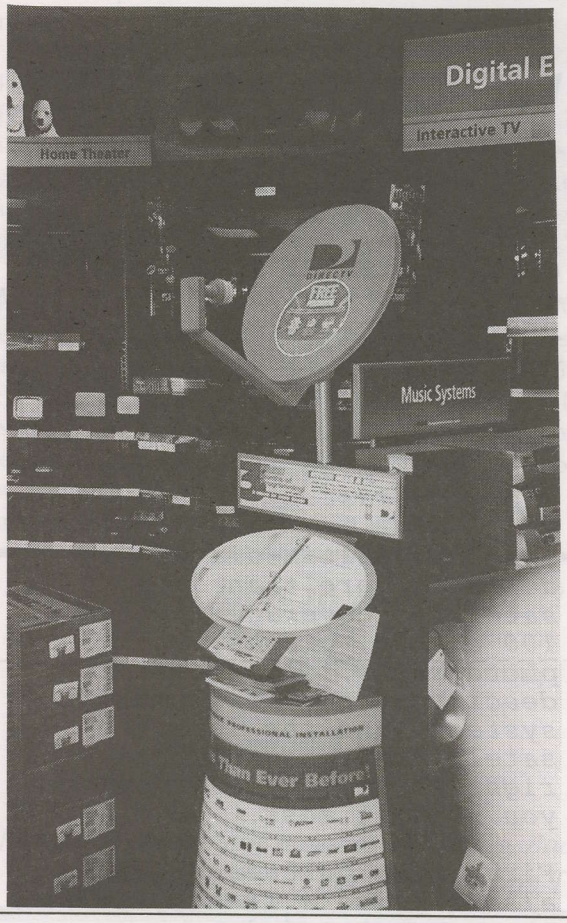
There are more than "200 market areas" in the USA and seven "national" networks. For each market area, terrestrial stations reach out 100km in a circle around the tower. If we assume each channel uses 100,000 watts of transmission power, we have 700,00 watts per market and 140,000,000 watts blasting into the atmosphere for 200 markets. On the other hand, a single **100** watt Ku band transponder can deliver all 7 network signals *to the entire nation*!

Australia and New Zealand are at a cross-roads; it is now decision time. Go ahead with conversion of terrestrial transmitters to digital and spend the next ten years building relay stations to fill in the holes left when analogue is turned off leaving digital as the only game in town, blasting millions of watts of power into the atmosphere in the process. (Do you really want to know why there is an ever larger Ozone layer hole? The pollution is not all *chemical.*).

Or face the music and tell the broadcasters they have no choice - go to satellite with their digital or get off the air.

This is a very difficult issue for politicians to face. They depend upon their alliances with radio and TV to plaster their faces and repeat their words into homes. The broadcasters are afraid of the satellite devil, comfortable with the devil they already know. Neither politicians nor broadcasters will shut down terrestrial and move to satellite on their own initiative. But a pay-TV company can force the issue, take the terrestrial signals into space as DirecTV has done in the USA, as Foxtel *could* do in Australia and Sky *might* do in NZ.

This is the *correct* solution because for consumers it provides all of the channels to every home at equal and dependable reception levels. And reduces Ozone layer *stress* in the process.



Satellite pay-TV in USA is sold through thousands of Radio Shack stores, ten's of thousands of consumer electronic stores, even "kiosk" displays in shopping malls.

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OBSERVER REPORTING FORM - Due December 4, 2000

• NEW programming sources seen since November 1st: _____

_____

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

_____

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

_____

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

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Make/size dish _____ LNB _____ Receiver _____

Your email address _____ **if you have one!**

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SPACEnet 4 - 172E

This is an older satellite moved here from 101W. The power levels for the 12 horizontal transponders are lower than we are accustomed to - 8.5 watts per TWTA, and on the vertical channels 16 watts. The satellite originally had Ku band (12.25 - 12.75) on board as well but the operational status of this segment is not known - last reported "broken."

The beacon frequency is variously reported as 4195 to 4200 and was first reported by *David Pemberton* (Australia) around 0500 UTC on November 3.

Original owner GE (General Electric) is not saying why this satellite has been moved from 101W to 172E but GE does have a very significant satellite with both C and Ku planned for this location sometime in 2002.

Richard Brooks, Marshall Islands, reports this satellite when last in use for North America had the following frequencies operating: TR13L on 3740Hz, Tr13U on 3780 Hz, Tr14L on 3820Hz, Tr14U on 3860Hz, TR15L on 3900Hz, TR16L on 3980Hz, TR16U on 4020Hz, Tr17L on 4060Hz, Tr18U on 4180Hz. There are 12 horizontal transponders each 36 MHz wide. On vertical, Tr3 on 3800Vt, Tr4 on 3860Vt, Tr6 on 3920Vt, Tr 10 on 4080Vt.

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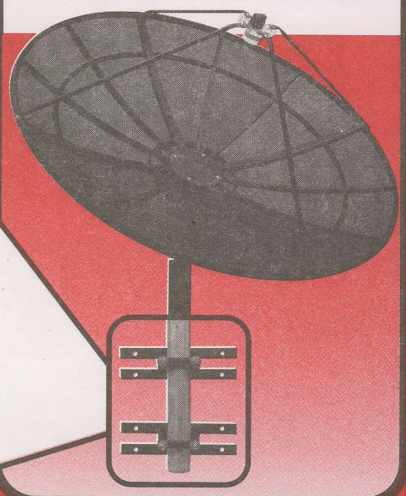

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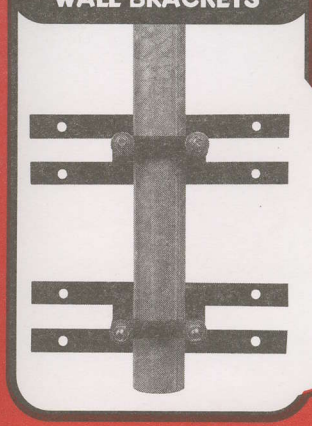

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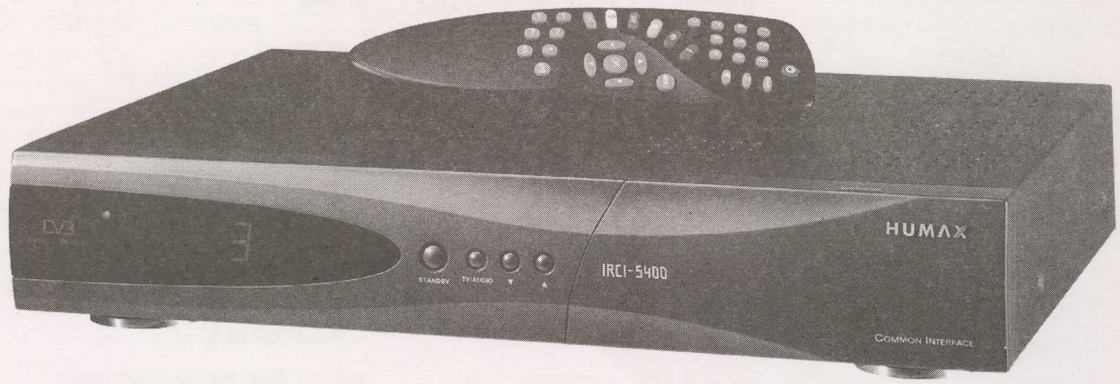

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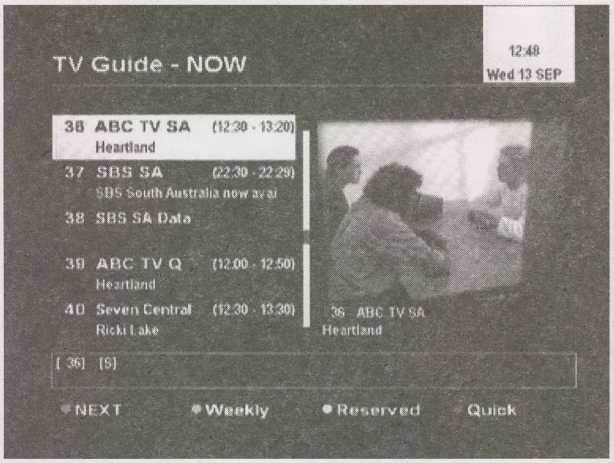

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