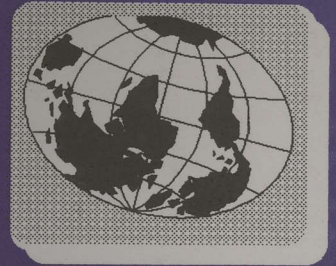


Bob Cooper's

AUGUST 15 1995

SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific Ocean Region

IN THIS ISSUE

JCSAT-3

**Mysterious
New C + Ku Bird:
Mission Unknown**

Spectrum Analysers:

**Learning To
Drive A
Wondrous Machine**

STILL MORE:

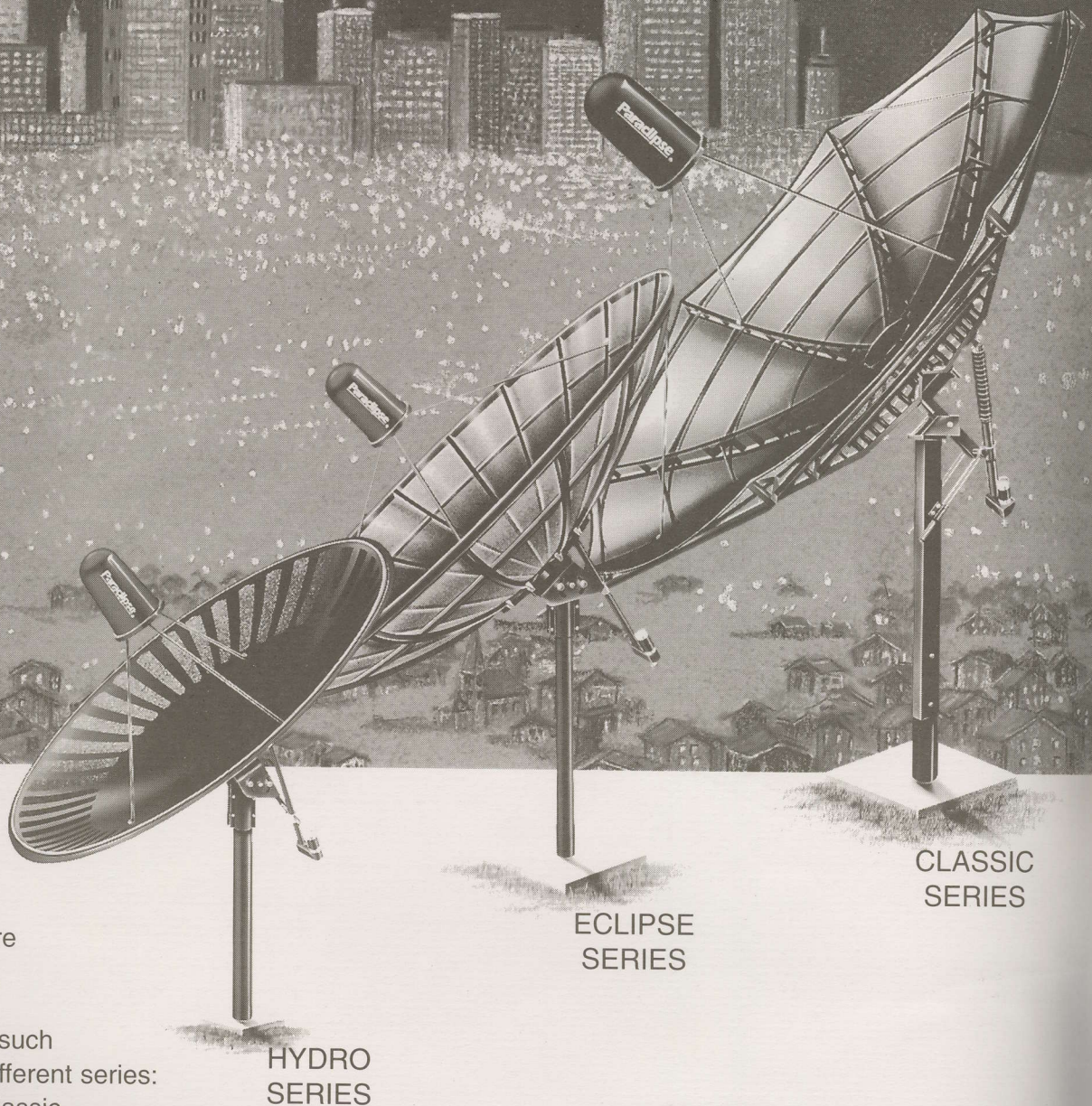
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MONTHLY

SatFACTS Monthly is published 12 times each year (on or about 15th of each month) by Far North Cablevision, Ltd. This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no longer define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of the messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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COOP'S COMMENT

Pandora's Box: "A process that once activated will generate many unmanageable problems."

Digital IRDs: Some suggest say a Pandora's Box waiting to be opened.

As we approach launch day for AsiaSat 2, and the first wide scale distribution of digital consumer receivers in the Indian/Pacific region (and this includes the 2.5 billion people in Asia), those who attempt to earn a living in the satellite television world will be facing increased pressure to deliver the programming consumers know is available, or ... lose the sale to someone who will do so.

New Zealanders are fortunate: They have a government which believes that if a transmission signal lands in your backyard, you are entitled to receive it and subject only to copyright laws, do with it as you may wish. Australians are not quite so fortunate: They have the Australian Broadcasting Authority to decide which programme sources they may watch and those they may not. The ABA does not actually ban specific services, but it does ban viewers in Australia receiving and paying for television that originates outside of the country.

The precise ABA definition of what constitutes "foreign pay television" has never been clearly stated (we have searched records for months trying to pin this down, to no avail) so here goes my interpretation:

- ◆ A foreign pay TV service originates outside of Australia and is broadcast into Australia on a satellite other than those operated by Optus (Aussat).
- ◆ A foreign pay TV service charges a monthly (or annual) fee, and is conditionally authorised by the programmer for each receive site.
- ◆ In a subscriber roll print out for such a programmer, each such subscriber would appear as a customer.

Alas, there are exceptions to the ABA rules, also never clearly stated in ABA (or other accountable) literature.

- ◆ A hotel or private member club can 'subscribe' to these foreign originated services.
- ◆ Under some circumstances, subject to approval, a SMATV or cable system might subscribe.
- ◆ Ditto for private businesses, such as stock market and brokerage offices subscribing to Asia Business News (for example). Also subject, if required on a case by case basis, to ABA approval.

Enter now Pandora's Box.

A digital receiver functions only when it is addressed. There is no such thing as totally free to air as even the not-to-be-charged-for services such as Deutsche Welle will require a one time "conditional access" fee. However, once a receiver has been authorised for DW, and/or for the STAR Movies or any other "conditional access" service, that receiver can be packed up and reshipped to any other country in the world where the same satellite signal reaches. Consider Indonesia's Indovision service, 15 subscription programme channels (including HBO, ESPN, Discovery and MTV), agreeing to be on AsiaSat 2 as a part of the STAR package. Add to that STAR Prime Sports, BBC, Star Plus and Channel V programming and you will have no fewer than 20 desirable channels. One dish, one receiver, one authorisation. We predict the ABA will never see what hit them and IRDs will flow from country to country with few real restrictions.



August 15, 1995

In Volume 1 ♦ Number 12

JCSAT-3: Loaded Bird, Uncertain Mission (page 6)

SPECTRUM ANALYSERS: Putting One To Work (page 9)

REBUILDING MATV for satellites / part 5 (page 12)

NEIGHBOURHOOD CABLE: Fenceline distribution / part 6 (page 16)

Departments

Programmer /Programming Update -p.2

Hardware/Equipment Update -p.4

SPACE Notes: Trade Show Planning -p.20 ; With The Observers -p.22

Audio-Only Reception Basics -p.25

SatFACTS Orbit Watch -p.27; August Reporting Form -p.29

-ON THE COVER-

What happens when you 'marry' a clothes line and a satellite dish? David John Bracey (Mirrabooka, WA) may have found the answer to both municipal zoning restrictions and dirty movies with this novel backyard installation.

MEET MARK LONG



His "World Of Satellite TV" has introduced tens of thousands world-wide to the wonders of home dish satellite reception. And, Mark's "Asia/Pacific Satellite Directory" is the most frequently used industry reference book in the Pacific Region.

Mark Long, who now makes Thailand his home base, will be amongst the premier lecturers participating in SPACE's South Pacific Region Satellite & Cable Show (SPRSCS) January 23-27 in Auckland.

If your understanding of the "basics" of satellite TV could use some fine tuning, be on hand January 24 to hear Mark's 15 years of practical experience unfold. And should you miss that date - Mark will be back January 25 and 26!

SPACE Pacific's
South Pacific Region
Satellite & Cable Show
January 23-27
Auckland

PROGRAMMER PROGRAMMING PROMOTION

UPDATE

AUGUST 15, 1995

PanAmSat PAS-4 lifted off without problems at 22:58 GMT on August 3rd with the entire Pacific region satellite world watching via PAS-2 (transponder 8C; 3900H and on Ku [for NE Asia] on 16K 12,700V). The satellite will provide DTH, cable and broadcaster links from 68.5E with Ku services boresighted on India as well as southern Africa. Observers as far east as central Australia should find the C band signals very potent and we solicit first-time reports from readers.

AsiaSat believes the mysterious explosion of Chinese Long March rocket 2E that brought down APSTAR 2 in a fiery ball last January may have been caused by an unanticipated "wind shear." Since the loss of AP2, users of the Chinese Long March service have been reluctant to proceed with additional launches. Insurance carriers, essential for all launches, have not wanted to proceed with post-AP2 launches until a cause of the loss was sorted. AsiaSat 2 is one of several launches delayed by the investigation. A release from AsiaSat early in August states:

"When our (AsiaSat) experts have confirmed all of the risks have been minimised, we will be announcing a probable launch date for AsiaSat 2 (later this year)."

Japan's JCSAT-3, with C and Ku band on board (see special report, p. 6 this issue), will be headed for 128E on the 29th of August if the scheduled Atlas 2-AS lift-off occurs on schedule.

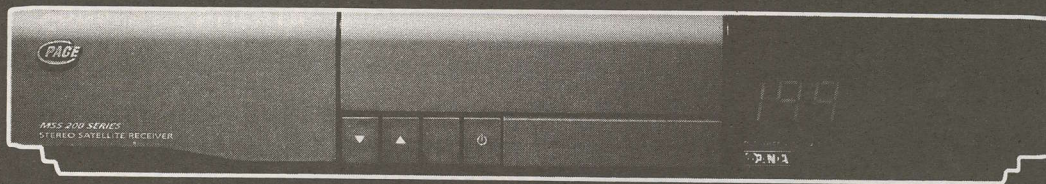
Reception from PAS-2 Ku transponder 4V, intended for Asia and 'by the book' far too weak to be seen south of the equator, is turning up from Perth to New Zealand and north to the equator. English language (Mandarin subtitled) Orient Communications service is subject of mini-report, p. 24 this issue.

STAR TV in a letter late in July advised, "*Our position with regard to our digital service on AsiaSat II, though not yet finalised, has recently become a little clearer, as a result of which (we) can inform you that STAR television is unlikely to make its service available to Australia in the foreseeable future.*" The problem is multi-sided: STAR movies, on the pay channel, have not been cleared for distribution in Australia, and, STAR ownership is linked into Australian pay TV through a stake in the Galaxy DTH service. STAR's position with respect to New Zealand and the balance of the western Pacific is, according to SPACE Pacific, "*In a very delicate state at this time and we have our fingers crossed!*"

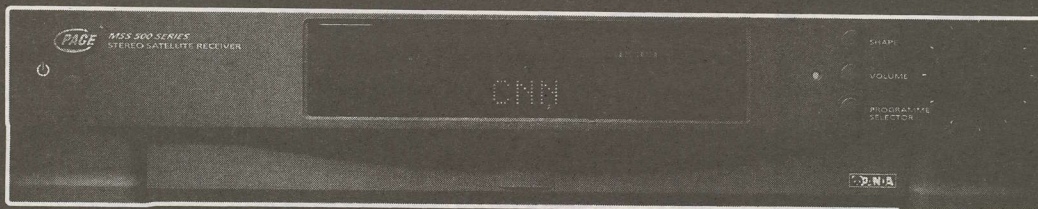
SatFACTS cannot verify a report appearing in the August Av-COMM Newsletter claiming that Australian ABC and SBS may be transmitting "in the clear PAL" soon. We can report that both services have been negotiating with Galaxy to add their rural broadcast services (along with the independent regionals such as QTV) to the Galaxy conditional access package on B3 when it becomes fully operational. However, Galaxy has so far refused to agree that ABC and SBS can control their own 'conditional access' (IRD) stream for the services, and this stumbling block has kept the parties from completing a deal. Galaxy B3 tests from 156E should begin about the time you read this. The line-up of services to be on B3, and B1, remains unknown (even to Optus).

TNT/Cartoon Channel SA 9708 IRDs began arriving at New Zealand cable and SMATV systems late in July; Turner warns us to anticipate delays "*of 6 to 8 weeks*" between payment and shipment. Motel rates: US 9 cents per day, occupied room (NZ/A12 cents; around NZ/A\$3.60 per month for 30 days).

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SatFACTS August 1996 ♦ page 3

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UPDATE

AUGUST 15, 1995

PACE/Irdeto receivers, the hardware for the rollout of Galaxy DTH on Optus B3, are arriving in Australia in quantity. An internal Hills Industries 'memo' issued in Australia reports it will be supplying some quantity of dishes to Galaxy; many other suppliers are also involved. Receivers for AsiaSat 2 will be on demonstration at German IFA Show (Berlin) late this month; the only such units currently in Asia are for demonstration, not sale.

Equipment implementation delays will keep Deutsche Welle from launching their MPEG DVB compliant service "before January (1996)." DW advises, *"AsiaSat has confirmed to us the launch of AsiaSat 2 as mid-September (see page 22, here), however: Due to problems with the hardware for the uplink in Berlin and the turnaround service in Israel, Deutsche Welle's signal will not be available (in MPEG DVB compliant format) on AsiaSat 2 until January."* DW also is first to advise of a downlink frequency (transponder 10-B, 4,000 MHz; IF of 1150) and polarisation (horizontal) using AS-2. The service will have dual (digital) audio channels for the TV programming and also carry a German stereo radio programming service and up to six monaural non-German radio service channels. As DW will be utilising only 25% of the available 36 MHz 'bandwidth', they will lease out the unused portions of other programmers (not yet announced). See SPACE NOTES this issue for the authorisation routine.

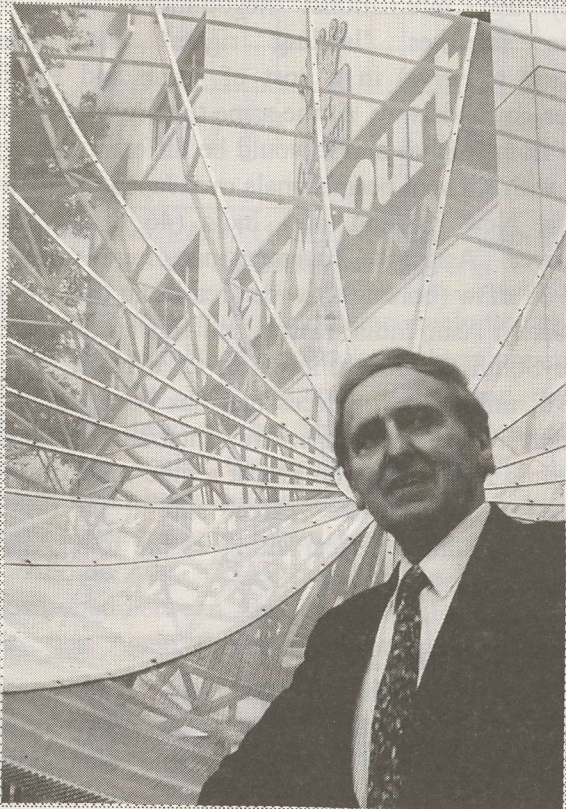
SMATV installers will be interested in a line of modular (plug-in) satellite receivers and cable quality single channel (field programmable) modulators recently introduced by Canadian supplier **NII Norsat International Inc.** (302-12886 78th Avenue, Surrey, BC, Canada V3W 8e7; FAX 604-597-6214). Norsat, well known for their LNB and analogue satellite hardware, appears to be adopting a European technique that utilises a single 'base plate' for each channel to be processed; the user selects which input (satellite IF to baseband video and audio) module is required, mates it on the base plate with an appropriate SMATV/CATV grade modulator module and ends up with a complete self contained "satellite TV in / PAL analogue programme channel out" system. With field programmable modulator output channels (covering all standard band I and III channels as well as 'S' and Hyper band), the system remains flexible in operation to allow field changing of any parameter to suit changing needs in the system itself.

Les Brooks (Alice Springs, NT) has developed a 60cm antenna size extended threshold portable Ku band receiving system for users of Optus ABC, SBS and commercial TV stations. The system is fully portable, can be set up and knocked down in just minutes of time and makes possible reception at temporary sites throughout the primary Optus coverage ranges. (Les Brooks, (61) 089-528-469; mobile 018-897-180)

Philips has begun shipping an innovative Ku LNB that seems to answer the problems created when new satellites operate outside of the normal (for the Pacific) 12.25 - 12.75 GHz range. Their model SC819Q, now available in Europe, allows reception over 10.7 to 11.8 GHz in one group, 11.7 to 12.75 in a second group to receivers equipped with an IF range of 950 to 2,150 MHz. The LNB/feed unit has four outputs (2 for each polarity [vertical, horizontal], for each of the two [low and high] bands) and receiver switching is done if required by mating to now standard 13/18 volt and 22 kHz switching standards.

NEIGHBOURHOOD CABLE
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08 August 1995

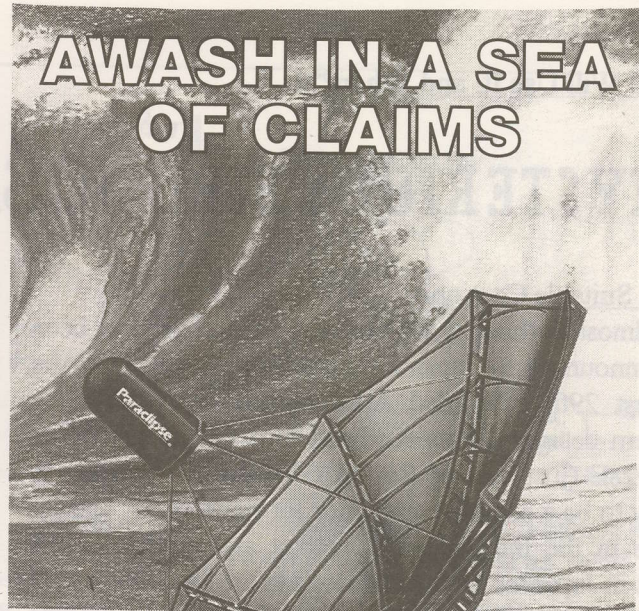
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Most sincerely,

Norman Barry



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C Band First Side Lobe	-20.0dB
C Band Antenna Noise Temp.	23 degrees K at elevation 45
f/D	0.31
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SatFACTS August 1995 ♦ page 5

MYSTERIOUS BIRD JCSAT-3 TAKES TO FLIGHT

With Suitable Caution-

Almost nothing is known, almost nothing has been pre-announced by Japan Satellite Systems (Inc.) for the August 29th scheduled Atlas launch of JCSAT-3, a modern design C plus Ku band bird that is scheduled for 128E (just east of Rimsat G1). Yet the satellite is likely to be a serious competitor for transponder leasing space in the Indian-Pacific market and represents the latest in Japanese bred technology in the satellite field.

JCSAT-1 (launched March 1989) at 150E and JCSAT-2 (launched January 1990) at 154E are higher power (53 dBw) Ku band (12.25-12.7 GHz) satellites with a primary mission of providing small dish (60cm range) TV service to Japan. Also on board: an international beam with the ability to cover into Hawaii, Korea, China, Taiwan and Singapore. These international beams have not been routinely used because until April 1995 JCSATs were thought of primarily as domestic satellites.

However, back in mid 1993, the attitude concerning the JCSAT satellites began to change. A new corporate foundation was created (a merger between JCSAT and

SAJAC) and international negotiations to allow Japanese satellites "landing rights" (i.e., legal permission to serve) in a host of Asian and Pacific countries got underway. At the same time JCSAT-3 was ordered from Hughes and it would be different: Ku and C band with Ku spot beam signals over Japan (55 dBw), Australia, New Zealand, and, India (46 dBw), zone beams over Asia (see coverage map, here). And, a C-band 37 dBw (boresight) wide area beam that would cover eastern Asia, India, Russia and Hawaii (and drop into the South Pacific at levels of 25 dBw or more). JCSAT-3, unlike the predecessors, has been designed from 'start', to be a competitive, international grade satellite and it is coming on line at a time when both C and Ku transponders are scarce, and at an orbital location with almost perfect 'siting' to the total Asia / Pacific market.

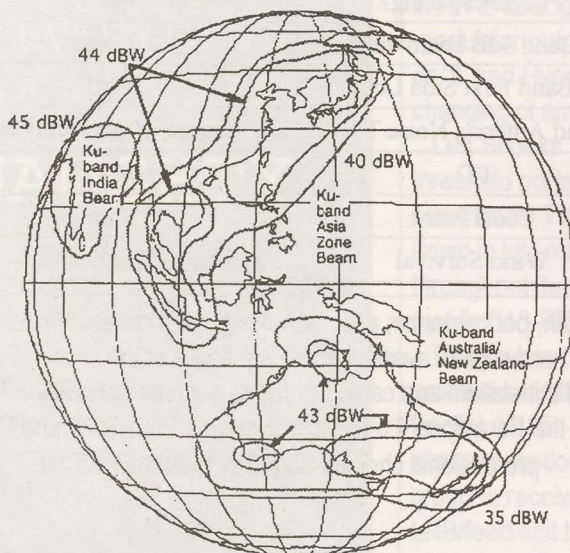
Who Might The Users Be?

For all of their technical capability, Japan's inward looking telecommunications industry has only recently begun to think of itself as an "exportable" commodity.

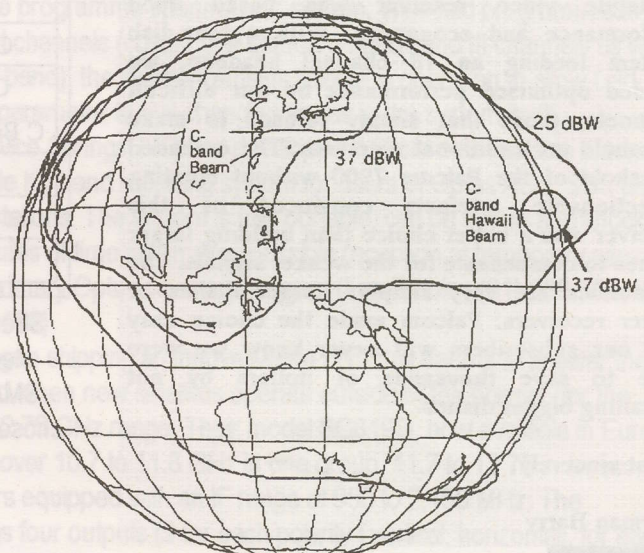


JCSAT-3 Service Coverage

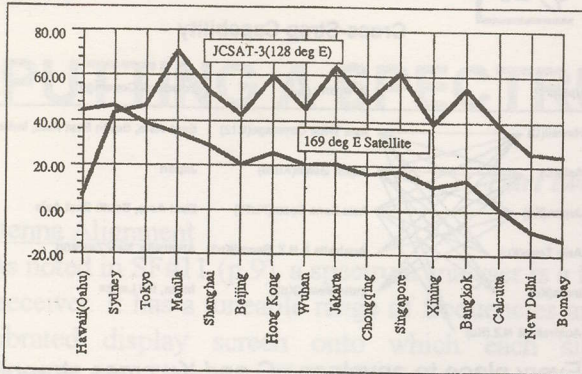
Ku-band Service Coverage



C-band Service Coverage



SATELLITE ELEVATION ANGLE

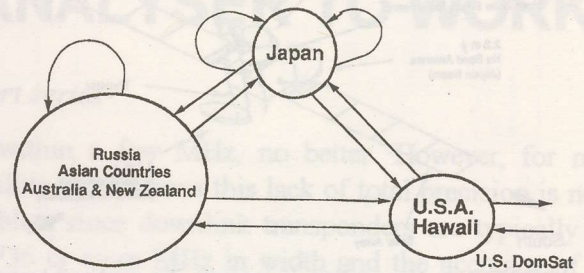


JCSAT-3 vs. PAS-2 (169E). For most Asian locations the Japanese 'win' this one

They have some stiff competition, including but hardly limited to the folks at PanAmSat. In literature created by JCSAT, one very pointed illustration takes on PanAmSat head-on (see above). This document is all about 'look angles', the number of degrees the satellite is positioned above the equator for various users. High look angles are good, lower look angles are less good.

Additionally, JCSAT sees itself as being a 'gateway' positioned between Asia, the South Pacific, and North America. Again, this is a marketing posture previously

Communication Via JCSAT - 3

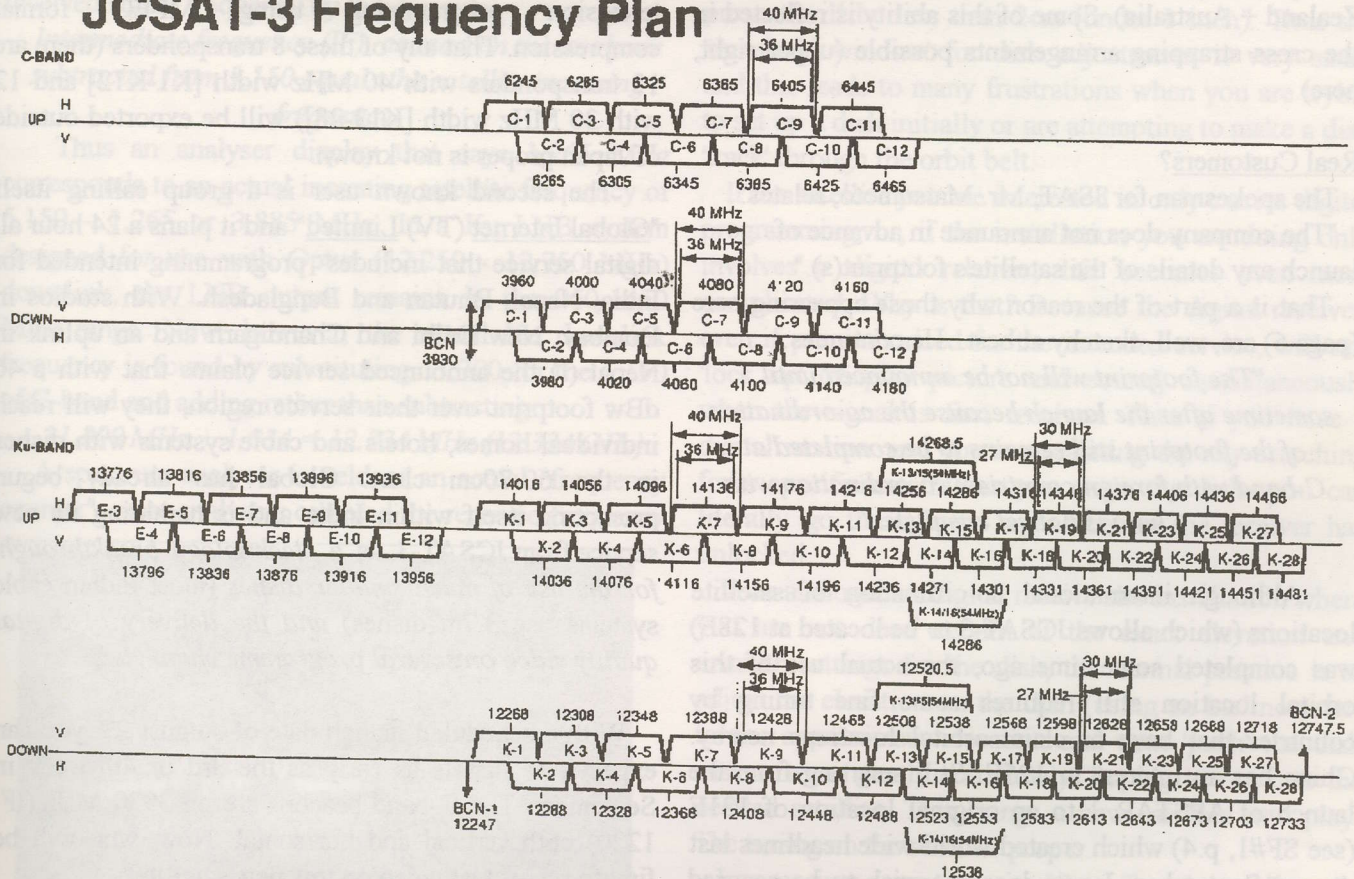


GATEWAY configuration of JCSAT-3 allows it to straddle North America and Asia as 'relay'

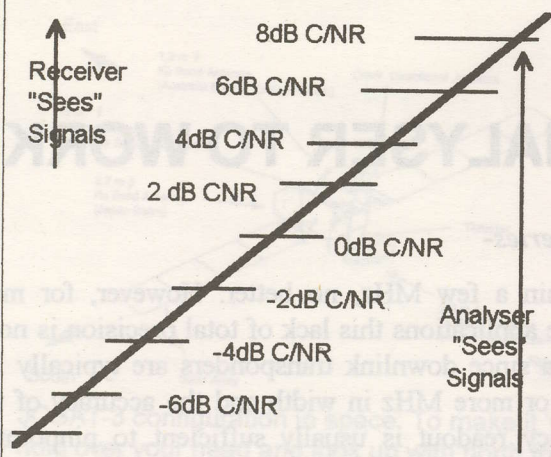
adopted by PanAmSat and the illustration (above) says "We can do this, too!" all over it.

How JCSAT will position itself, as a satellite provider in direct competitor with PanAmSat (and others yet to appear in the marketplace) remains to be seen. PanAmSat will tout its world circling network (the launch of PAS-4 allowing PanAmSat to essentially "talk to itself" in a giant 1.6 second echo chamber), its dedication to digital compression, and its owned and operated uplink facilities around the globe. Where the

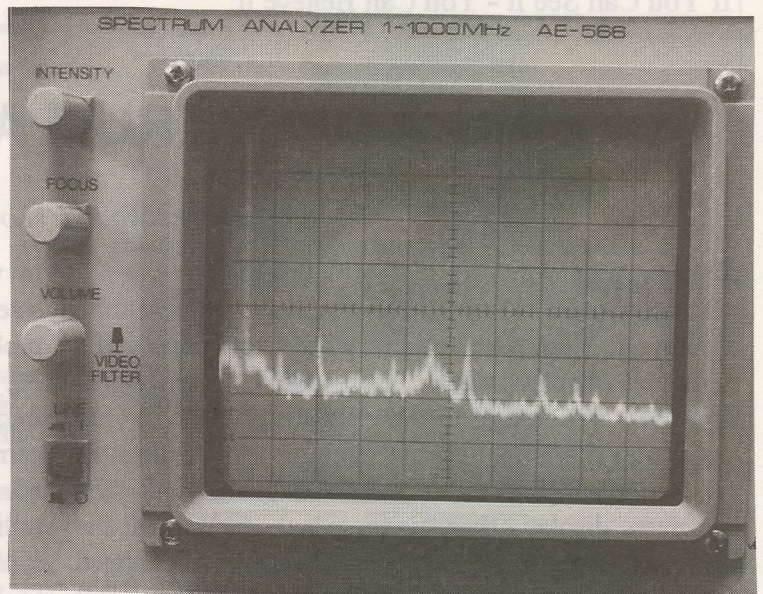
JCSAT-3 Frequency Plan



JCSAT-3 has 'unusual' downlink range on C-band (3,930 to 4,200; IF 950-1220 MHz). Ku is 12.25-12.75 GHz.



Signals on display screen (right) are too weak to 'trigger' standard satellite TV receiver display circuits but clearly show on analyser display screen (US C-band domsat on 7.3m, Auckland)



dish east and west. If a signal shows up, you immediately stop moving the dish and attempt to peak the signal using the azimuth (east-west) adjustment, the elevation adjustment and the polarisation control on the feed.

All of this is happening within the tiny window of signal level which characterises the range between the first hint of signal and a perfect picture.

An analyser expands the "threshold window" typically by a factor of 2; more if the analyser has some extra 'bells and whistles'. In other words, if your receive system when fully peaked produces a carrier to noise ratio of 8 dB (C/NR), your window is 8 dB. Anything less than 7 to 8 will have noise in the picture (sparklies), anything less than 3 to 4 will be difficult (perhaps impossible) to even identify and below 2dB C/NR you may slide right over the signal and not even notice it is there. Translate this back to how far you can move the dish (in azimuth / east-west, or elevation / up-down) and the range of physical movement for the dish becomes very small; perhaps as little as 10mm.

Does this mean the threshold for the spectrum analyser is lower (better than) than the receiver?

Actually, no. Recall how some satellite receivers produce better pictures (or claim to do so) by offering a bandwidth narrowing tuning feature.

As we investigated in SF#4 (p.7), SF#5 (p.8) and SF#6 (p.9), if a satellite programmer utilises a 27 MHz bandwidth to transmit his video and audio, and the received signal is "below threshold" (i.e., the picture has sparklie noise present), it is possible by adjusting the receiver's bandwidth to a narrower position to reduce the noise content. However, if you carry this too far (go too narrow) the picture develops significant 'jitters' and becomes unstable (in addition to being noisy).

The spectrum analyser has no such limitation. Since you are not recovering picture (and sound), but are only representing the signal level of the carrier present with a line on a display screen, you can adjust the analyser's bandwidth to a very narrow position (such as 0.3 MHz) and still detect the presence of the carrier. This is a very

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YEAR 2

YEAR 3

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YEAR 5

YEAR 6

YEAR 7

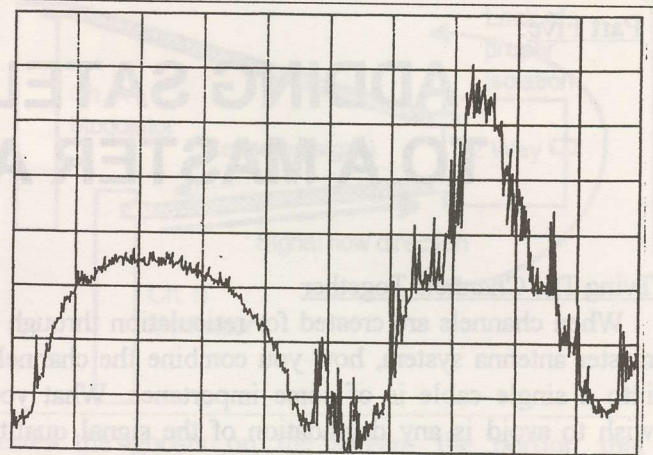
for SPACE Pacific

useful tool when attempting to first locate a satellite as it shifts the analyser's "threshold window" well down the line. Signals that would represent a C/NR of 0 dB on a standard TVRO receiver are quite distinct and observable in an analyser bandwidth of 0.3 MHz or 1 MHz. Thus with an analyser you will see the signals displayed on the screen well before they would ever be detected by the standard TVRO receiver; regardless of the TV receiver's own threshold or bandwidth setting.

This makes the analyser a very practical tool for finding signals that are very weak. If, for example, your dish elevation adjustment was 'off' by a full degree, in most instances you would not even detect the satellite signals as you swept the dish east - west looking for signal. With the extended threshold of the analyser's narrow bandwidth, you will be able to 'see' the signal(s) pop up on the screen and once found you can then work through the various adjustments (including the erroneously set elevation) to peak the signals.

Independent of Format

Because the analyser does not actually recover the signal itself but merely creates a cathode ray tube display that represents the presence of the signal, you will find similar (although not identical) displays from all signal formats: analogue TV, analogue narrow band



Digital vs. analogue. Digital carrier (left) has symmetrical, rounded top while analogue is jagged and pulsating with a shape that changes as picture content changes. Digital is stable and unchanging.

(such as voice and data carriers), digital wideband (TV) and digital narrow band. Whereas your analogue or digital receiver will usually ignore the presence of a format it does not recognise (i.e., was not designed to receive), the analyser ignores nothing; not even noise. If there is a carrier present, irrespective of modulation format, it will detect and display that carrier on the screen.

Series completes SF#13.



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Tying The Channels Together

When channels are created for reticulation through a master antenna system, how you combine the channels into a single cable is of some importance. What you wish to avoid is any degradation of the signal quality and this is best accomplished by maintaining a degree of 'isolation' between individual channels.

Each channel occupies its own bandwidth; typically 7 MHz of spectrum space in a PAL format system in the Pacific (SF#8, p.11). Individual channels, whether terrestrial or locally generated with modulators (fed by satellite or character generated text or VCRs), have an established 'signal level' within the system. The two component portions of an analogue PAL format signal (the video portion and the sound portion) are individually 'treated' by the headend processing equipment to ensure that each channel stays within its assigned spectrum space and does not 'bleed over' into an adjacent or other system channel (SF#9, p.6; SF#8, p.12).

If the channels leave the headend "clean" (i.e., each occupying only its assigned bandwidth and electronically adjusted not to bleed over into other channels), the television receivers connected to the system will then be able to operate properly without bleed over from one channel to another. The primary causes of bleed over are:

- 1) Sound from one channel bleeds into the next higher (in frequency) adjacent channel.
- 2) An off-air terrestrial signal that fades up and down in signal level goes "up" and with the increased MATV system signal level it begins to bleed into the two adjacent channels.

3) One or more channels leaving the headend (signal processing) facility increase(s) in signal strength to a level where line (in-house repeater) amplifiers overload.

4) Off-air reception antennas under 'unusual' reception conditions inject new channels from distant transmitters into the system, which interfere with other (often local modulator created) channels already on the system.

Problem 1 is an initial set-up defect; using either a tuneable trap or by processing off air signals with a heterodyne signal processor, you gain control of the audio carrier level (SF#9, p.7). Problems 2, 3 and 4 are similarly solved by employing single channel off-air AGC (automatic gain control) equipped signal processors at the headend.

Some care must be taken when joining two or more channels together into a single (transmission / distribution) cable. In theory, every device and all cable in the distribution system is 75 ohm. It is very important that this be the case since impedance mismatches (such as you would find by connecting 50 ohm cable to a 75 ohm device) create unwanted signal loss and also cause an undesirable effect known as "reflections."

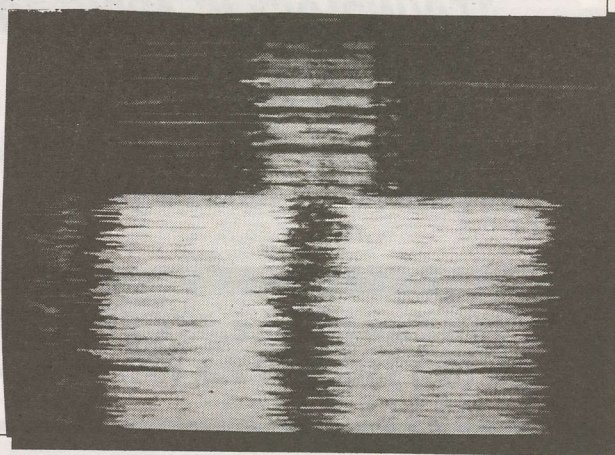
Reflections simply means that on the TV screen you will actually see ghosting (multiple images; a primary signal followed or preceded by a weaker, distracting, secondary image). Reflections cause the picture on the screen to "smear" (a transition of video from text to moving image, or on the edge of a face) seems to "smear" (bleed beyond itself) so that there is no longer a distinct edge to screen images. Another artefact of reflections is a high error rate for teletext services.

In an MATV system where channels are combined reflections occur because of mismatches. Every piece of

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equipment has a rated 'VSWR' (impedance match) which tells you how good the match is to the nominal 75 ohms required. Most equipment specifies match in decibels (dBs). This is a typical rating:

Return Loss:
 Input / 18dB
 Output / 15dB

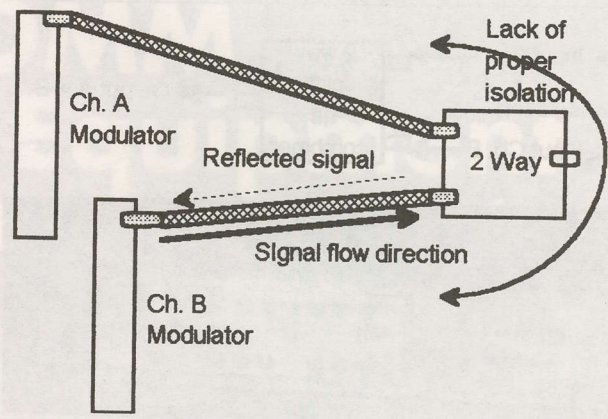
Translation?

If you connect a signal source to the input of this device and the signal level is +60 dBmV / 120 dBuV, some portion of that input signal will be 'lost' at the point of connection by the mismatch represented by the connector (and the circuits that attach inside the unit to the connector). An 18dB return loss means that 0.07dB of input signal is being lost at the input because of mismatch. That's obviously not much signal loss.

Alas, the 0.07dB of signal is not actually 'lost', rather it finds itself (because of the mismatch between the 75 ohm line and the not-quite 75 ohm impedance of the device connector) travelling backwards. In other words, signal that is not accepted (absorbed) by the 'load' (the device the cable plugs into) doesn't just go away; it goes backwards to the point where it started. This backwards travelling signal forms a part of something quite complex, called a 'standing wave' in the trade.

Travelling waves are bouncing backwards at the same time new energy is coming forward. When the backwards travelling standing wave runs into the connector at the other end (from which it started its journey down the cable), it runs into a new problem; a new connector with a return loss of its own. Now we have most of the standing wave backward-flowing signal re-entering the source connector but some of it then bouncing back again, now redirected towards the original load connector.

Visualise this TV picture bouncing back and forth from connector to connector, each time most of it gets "admitted" to the connector but some portion remains in the cable bouncing back and forth. It is this progression of flowing forward and partially bouncing back that



creates the ghosts on the screen; the portion that bounces back spends longer "inside" the cable, it is delayed in time from the original picture and appears then as a ghost (time delayed image) on the screen when it finally does get through.

Proper impedance matching between cable and units, and between units, avoids reflected waves, or makes them so weak that you cannot really see their presence.

The transmission line(s), the cable, and the parts that interconnect must "match" one another. Just because each is labelled "75 ohms" does not mean much unless you also know the accuracy of the 75 ohm rating. That is what the "Return Loss (rtl)" number tells you. A number such as 18 is good, 10 is not so good; larger numbers mean a better match.

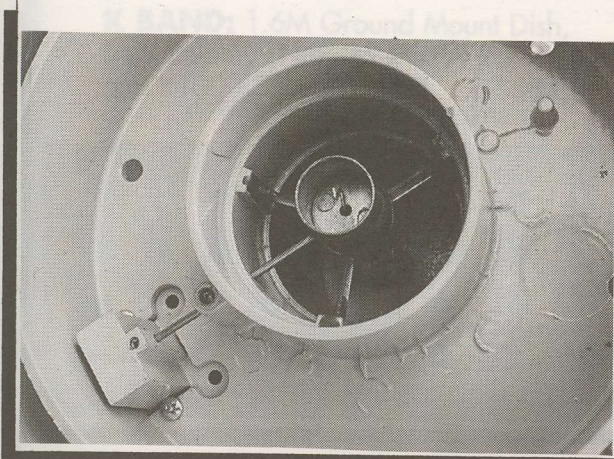
Match is always frequency sensitive. Take the lowly 'F' connector as an example. It might have a rtl of 20dB between 1 and 500 MHz, falling to under 10dB at 1,000 MHz. Or a two-way signal splitter, which the manufacturer rates with an rtl of 20dB from 10-400 MHz, falling to 18dB 400-550 MHz, but only 10dB from 550-600 MHz. As an aside, can you imagine what the rtl on this splitter might be if you happened to use one for L-band (950-1450 MHz)? The correct answer is "not good"; or more precisely, probably not usable.

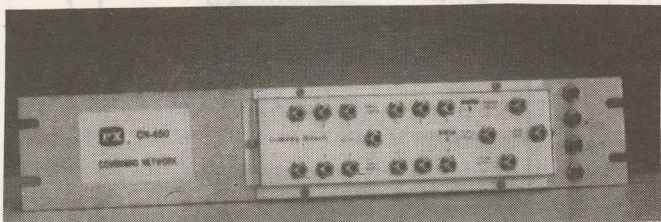
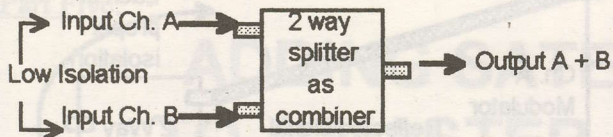
Impedance, or match, cannot be dismissed as an unimportant design criteria in any MATV system. This

PLACE YOUR BUTTS HERE?

This is not a high-tech ashtray. No, it is also not a low-tech cookie cutter. Give up?

Satellite tekkies know - a C plus Ku band multi-mode feed (ADL brand) when they see it up close. Right? You can be a satellite tekkie - to qualify, attend SPRSCS January 23-27 in Auckland. Invitations now available - telephone 64-9-406-0651 for yours today.





Splitters as combiners are dangerous unless exact characteristics are known; 12 channel combiner

should suggest to you that bargain basement priced signal splitters, taps, and even connectors may be poorly suited to use in a MATV system which you are designing.

Match In Channel Combining

The least complicated method of combining two channels is to take a two-way splitter and reverse it; use the output ports as inputs and the input port as the output. Plug two channels into the output ports and there at the terminal marked input you have the two channels combined. Quick, and not advisable.

In the 10-550 MHz region, a high quality two-way splitter will have port to port isolation in the region of 25 to 30 dB. You won't find these high quality units on a rack at Dick Smith or from local jobbers. What you will find is a two-way splitter that may (that means perhaps) have port to port isolation of 10 to 14dB. And that means that when you connect a signal source to one port, planning to combine it with another signal source at the second port, there will be interaction between the two ports. If the isolation is as low as 10dB, the amount of port 1 signal appearing across the connector for port two will be in excess of 31% of the original signal appearing at the first port.; in other words, 31% of the signal sent into port one ends up across port two. And



Rack mounted processors, modulators, satellite receivers are combined with combination of 8 and 12 way combiners

vice versa. Yes, the potential for standing waves; lots of them. And suddenly you have ghosting problems

Proper combining requires two things:

- 1) A "forced match" at all terminals in the combining operation;
- 2) High isolation between any two terminals (20+dB is a minimum).

Combining units designed with these parameters in mind are available. But they "use up decibels" because of the need to maintain both match and isolation at all ports. A 8-way combiner (suitable for combining up to 8 separate signal sources) may have 12dB of signal "loss" from the input ports to the combined output port. A 12-way combiner typically has 16dB of signal through loss. All of this is a price you pay to ensure that no two channels end up affecting each other through standing waves and impedance mismatches.

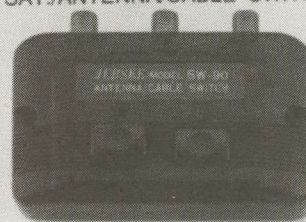
This series continues in SF#13.

IS YOUR WORLD ABOUT TO SWITCH?

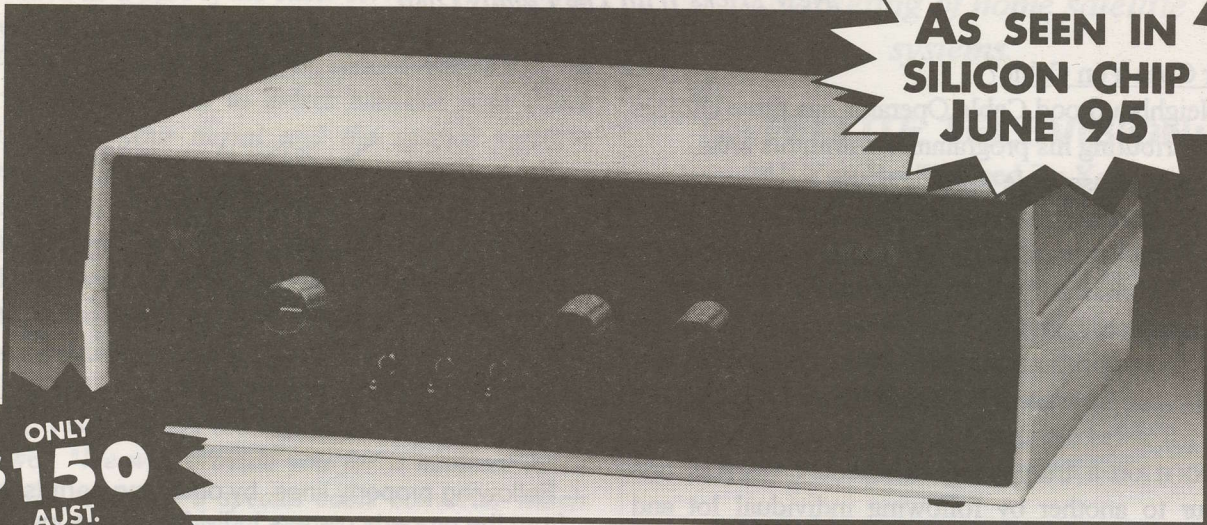
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THE NEIGHBOURHOOD CABLE TV SYSTEM

New Tricks With The Family Dish

Whither Goes Yon Cable?

The Neighbourhood Cable Operator has three choices (1) for distributing his programmes within his area:

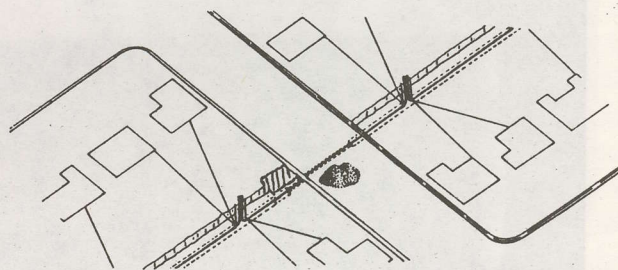
1) Rent / lease pole space on the existing (above ground) poles of the local utility company(ies);

2) Bury the cable underground, using either privately obtained permission ("easements") to dig up people's front or rear yards, or where applicable, after obtaining Network Operator (status) which allows you to do this even if the people who own the yards don't wish you to do so;

3) Do it on a truly "neighbourhood basis," as one neighbour to another by following individual lot and parcel lines using a combination of above ground (bottom of fence) and (shallow) burial techniques.

Of the three, burial of cable is the most expensive technique if you are functioning as a "Network Operator" and are following the safety and utility guidelines that go along with such an approach. In Australia, the Network Operator is simply someone who has obtained government sanction to build and operate a cable television system. In return for this formal approval, you are also entering into a form of contract to construct your system following "standards" which any utility (type of) company must also follow. This may not be the least expensive way to approach the business since many standards were designed for high voltage power or security conscious telephone utilities, and should not apply to a simplistic cable TV system. But, alas, if you accept the "rights" that go with being a "Network Operator," you must also accept the safety and legal responsibilities that also attach to such status. There is another option.

1/ Cell-site design is a fourth option, eliminating trunk cables, replacing with CARS band microwave.



Following property lines, by obtaining permission from the property owners individually, is a low-cost way of running your cables.

Certainly the least expensive approach is to not bury and not use the utility poles. Rather, by visiting with your neighbours you obtain their individual permissions to lay your cable just below the surface of the ground (a slit trench 30cm deep is often adequate), or if they approve, actually attach the cable to the lower portion of their fence (if they have one). Those who have done this suggest verbal permission is not adequate; there should be an agreement in writing, signed by each property owner, that allows you to cross (under or through) their property with your cable (2).

One proven approach is to explain that you are intending to "share" the programming from your satellite dish(es) with your neighbours, and you must run a small piece of coaxial cable to do this. Tell them you call this "Neighbourhood Cable TV" (a quaint name) and they have the option to subscribe to the service or not, quite separate from allowing you permission to cross through their property. They will have questions:

COMING IN LATE???

Copies of the first five parts in this series are available for NZ\$15 airmail; address request to (Neighbourhood Cable TV), SatFACTS, PO Box 330, Mangonui, Far North, New Zealand. Why would you want the first five? Because Neighbourhood Cable TV is the hottest new business in electronics. Remember the first video rental shops? This is the 'ground floor' ten years later. By being there, first, you can make your system grow out of receipts (income), or, position yourself for a nice buyout when the big boys (read Telcos) finally wise up to what is happening and begin to wire entire towns and districts. This is your opportunity to cash in and these will be remembered five years down the road as "the good old days." Get there first: Make them buy you out!

1) Is the cable dangerous? Answer: "There are no unsafe voltages in the cable, only TV signals."

2) Will it interfere with my regular TV reception? Answer one: (If you will have the local terrestrial signals on your cable) "Actually, you can dismantle your existing (rooftop) aerial because the local stations are included as a part of the cable service." (If you will not have the local stations on your cable), "No, it will not. If you subscribe to the service, I will install a switch that allows you to select between your local reception from your aerial and the special satellite services on my cable."

3) May I disconnect from the service if I don't like it? Answer: "At any time; subscriptions are monthly."

4) May I connect two (or more) TV sets to the cable? Answer: "Absolutely; we will install the splitters and cable to do this if you wish."

5) How will my TV set receive all of these satellite channels; it is ten years old and only has 8 channels on it? Answer: "We will provide you for a nominal extra monthly fee rental of a special cable converter which will tune in all of our channels directly to your existing TV set" (see SF#8, p.7).

6) Is this the same as (Sky) (Galaxy) TV? Answer: "We have more programme channels (display list at this point), and we charge less per month per channel than (Sky) (Galaxy)."

7) Can I have your cable service plus (Sky) (Galaxy)? Answer: "Absolutely; we will install a switch to allow you to select between our cable, (SKY) (Galaxy) or your local TV antenna channels."

8) Can I tape record your cable channels that come from America, and Asia? Aren't they somehow different than ours here? Answer: "Before we place these satellite channels onto the cable system, we correct them so that they are just like local TV channels. Your existing tape machine can record and playback any of our channels."

9) Why should I allow you to run your cable through my backyard if I am not interested in your service? Answer: "This is a neighbourhood project and the only way I will be able to reach those homes past yours is to cross over your property. Think of this as a co-operative effort where even if you don't take the service, your neighbours may wish to do so. Without your co-operation, they will not be able to do so."

The Nitty Gritty

With the sudden wealth of free to air and reasonably priced cable services now becoming available (see SF#10, p.18), almost anyone in the Pacific can quickly

2/ A letter found suitable in New Zealand for this purpose is available as a guide. Ask for "Neighbourhood Letter" from SatFACTS, PO Box 330, Mangonui, Far North, New Zealand (fax: 64-9-406-1083)

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is a colourful consumer level explanation of what home dish reception is and how it works. This book, prepared by **SPACE Pacific**, is designed to help consumers understand why owning a satellite TV system is beneficial and practical. Additionally, dealers may sell the book for the front cover posted price of A/NZ\$10.

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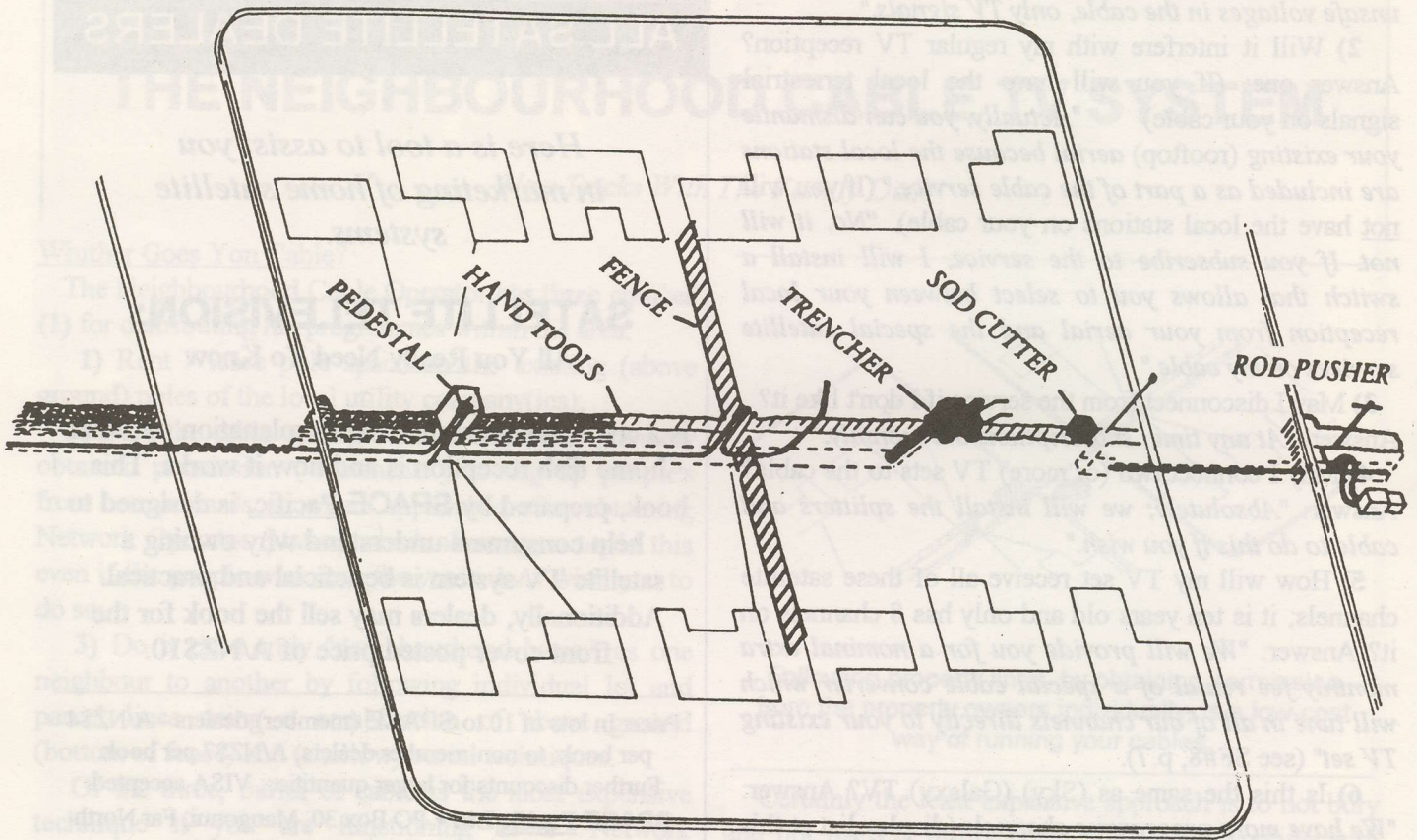
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Virtually every piece of equipment required in this "how to do it" drawing can be rented from your local weekend equipment supplier. For description of equipment pedestals, see SF#11, p.18.

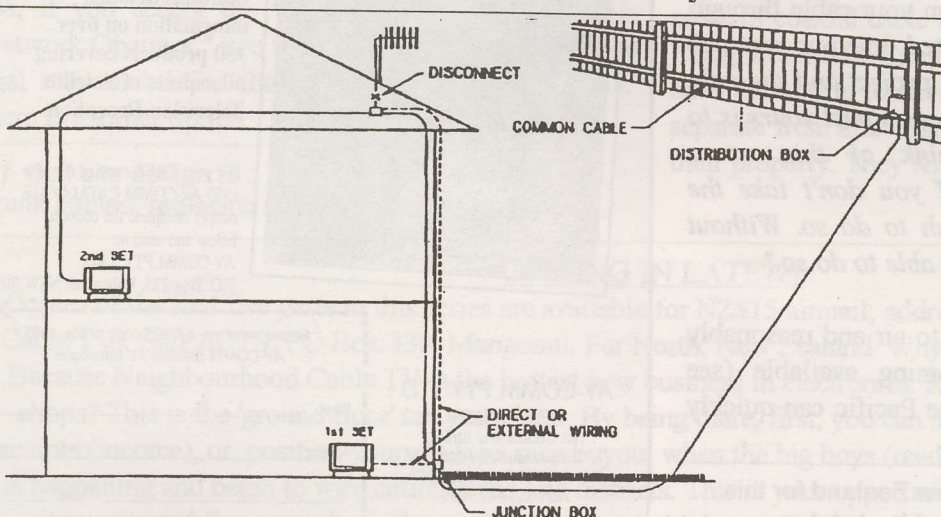
select from 12 to 30+ channels of programming which can be supplied very profitably in return for around NZ/A\$50 per month subscription fee. And as we saw in SF#7 (p.5), there is a nice profit incentive if you can

reach upwards of 50 homes from your own "cable headend."

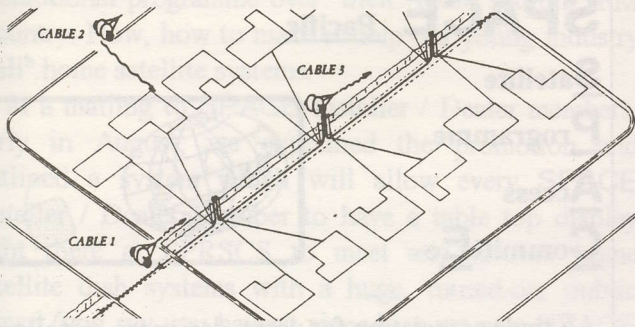
One approach to fence-cabling is shown here; the common (cable) line (typically .412 or .500 aluminium jacketed cable but in short systems of up to 1,000

metres a quality foam RG-11 could be used if the system is carefully laid out in advance on paper) is run above ground. At each home where a tap must be located (called distribution box in this BCL sketch), the tap box can mount on the fence. The 'drop cable' (RG6/U into the house) is buried as close to the surface as is safe.

An alternate view of a similar system appears at the top of the next page; this 'block' is being cabled by following the back lot



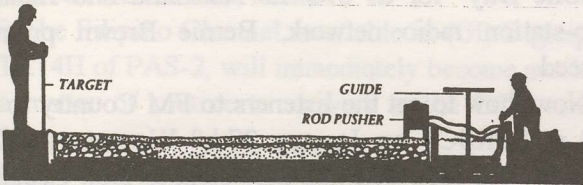
One approach to routing cable along back fence lines (courtesy BCL, NZ)



By cabling down back parcel lines, two sets of homes can be reached.

lines. In this way two sets of houses are reached from the same line.

Now, what happens when you need to cross a street? Setting aside the possibility of crossing over the street, that leaves going under. In most (political) jurisdictions you will require at least the approval of the local authorities to do this. Additionally, it will be in your best interest to check with the engineering department



Burial across a street? You could dig up (through) and then replace the paving.

for the town to determine what other lines (sewage, water, electricity, telephone) may be there first.

One equipment dependent technique to burying under a street is to "bore" or "push" your way across. Some systems use water pressure to force a sharpened tip horizontally across under the pavement. This requires that you dig two vertical holes, one on other side, and then 'shoot' from the first to the second using the mole or water pressure boring tool. Once the (typically 20 to 30mm) hole is punched through, a pull rope is pulled through the 'tunnel' as the boring tool is backed out and the rope then used to pull the cable itself.

Summary

Building a cable system is nothing short of hard physical labour. But before the cabling can begin, careful planning is a must. In this series to date we have looked at the financial and programming aspects, the techniques for system design and the options available to routing your cable.

The purpose of this series has been to introduce the world of cable television to non-cable people. While SatFACTS is putting together a follow-up series on this subject, we invite your questions and suggestions to aid us in covering the material that concerns you most.

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Emily Bostick
President

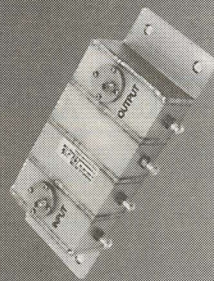


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a technical and marketing advisory
memo
to the membership from your
industry trade association group

August 15, 1995

Turning On The Consumers

The August 1st issue of SPACE Membership Notes reported that your trade association has put together a rather stupendous public event to bring (New Zealand) consumers out to the industry trade show for an "Open Public Day" on Saturday, the 27th of January.

The concept began with the Programmer Membership of CMT (Country Music Television) in SPACE. We knew the service is unique, that it has a high energy level, and that fans of CMT (now world-wide) are amongst the most devoted of all speciality programme channels. We also knew that in four New Zealand "marketing centres" at least one country and western radio station was enjoying commercial success. This told us there were New Zealanders out there who like this sort of entertainment. Now, how do we tell them about CMT, a "visual thing," being available on television?

The New Zealand Country Music Association was one avenue. And the nearly 100 "line dancing" club groups that have popularised this activity throughout New Zealand were another. Then we noticed that January 27th, a Saturday and already intended as a special day when members of the general public would be allowed to visit the SPRSCS Exhibit hall to witness "live satellite TV," will be on the first day of the annual (3-day) 'Auckland Weekend'. All of the pieces fell into place.

Auckland's FM Country radio station managing director Bernie Brown heard from us first. We proposed that FM Country conduct a listener contest over the

SPACE Pacific

Satellite
Programme
Access
CommittEe



A trade association for users, designers, installers, sellers of private satellite-direct systems in the POR

period January 7 to 27. This would not be just another listener contest with free ten-gallon hats for prizes; the grand prize winner would receive a complete 3 metre home satellite dish system, including a Scientific Atlanta D9222 IRD and a subscription to CMT for one year!!! SPACE would arrange and provide the equipment, and an installing dealer member to put it in the winner's backyard; all at no cost to the radio station. All the station had to do was to promote the "**Open Public Day**" for us over its Auckland and Hamilton two-station radio network. Bernie Brown promptly agreed.

Now, how to get the listeners to FM Country to turn out at SPRSCS on January 27th? We went to CMT directly and proposed that they send to New Zealand a CMT **Dance Ranch** stage show, to be promoted by FM Country and free to the public. CMT's Nancy Ahern, responsible for industry trade shows, was already considering having CMT at SPRSCS as a regulation exhibitor and in a matter of days the entourage had been expanded to include a first-rate stage show led by former Miss Texas and TV star Jo Thompson. Jo was selected to head the stage show because of the popularity of line dancing in New Zealand and the sizeable turnout that could be expected to participate in what may turn out to be the "*largest line dance event*" ever held in the southern hemisphere (Bernie Brown says we can count on 5,000 people to turn out!).

We were cooking. Now we had a no-charge professional stage show of special interest to a special group; country music fans. And a first class

BECOMING A 'MEMBER' OF 'THE SPACE TEAM'

By becoming a member of SPACE Pacific, you gain new opportunities to be a more active part of the actual workings of this young industry in the Pacific. There are four categories of SPACE membership; you select which level best suits your goals and aspirations from Individual Member to Installer/Dealer Member to Retransmission Member to Importer/Manufacturer/Programmer Member. Each category allows you special privileges and access to assistance and support as well as discounts when attending SPRSCS and with some supplies and suppliers. For a no-obligation 'Membership Application Packet' write SPACE Pacific Ltd., PO Box 30, Mangonui, Far North, New Zealand or fax 64-9-406-1083 to request same.

promotional programme over "their" radio station, FM Country. Now, how to make it help our young industry "sell" home satellite systems.

In a mailing to SPACE Installer / Dealer members, early in August, we explained the promotion and outlined a system which will allow every SPACE Installer / Dealer Member to have a table top display right there at SPRSCS to meet and discuss home satellite dish systems with a huge, turned-on, public crowd (you say you haven't signed up yet as a SPACE member? Pity.)

And this is only August. There is more to come, in co-operation with other satellite programmers. Let the home dish sales begin!

Programme Access Update

SPACE Pacific and **The Filipino Channel**, after seven months of negotiations, have come to an agreement that will allow distribution of 'TFC' throughout the (south) Pacific region. The agreement goes into low gear this month and moves to high gear in September. Here are the basics:

1) The Filipino Channel, available in (GI) Digicipher on TR14H of PAS-2, will immediately become available as a matter of routine to viewers at the DTH rate of US\$50 per year.

2) SPACE Pacific members have been appointed as "agents" for the service and each (Installer / Dealer) member will immediately qualify to have a GI DSR1500 IRD turned on for "free preview" of the TFC service at their shops. This means that as soon as you can obtain the GI receiver (available in New Zealand and Australia through Maser Technology Group) you should contact SPACE for the authorisation procedure. Details to members at (tel) 64-9-406-0651.

Conditional Access Procedures (#1):

How do you get a Pace (or other fine) MPEG DVB compliant receiver authorised for digital reception? If the service is not pay (as in a monthly fee), you will contact the programmer or a authorised programmer agent after you have the receiver in hand. Why wait? You will need the individual receiver IRD (authorisation) number.

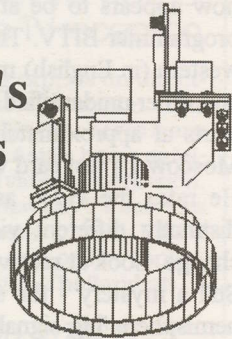
You can establish yourself as a dealer / installer / user of conditional access programming by pre-signing with Deutsche Welle. They will add you to a "waiting list" and at your request also add you to their monthly programme guide mailing. Programme information listings will also be available on INTERNET ("http://www-dw.gmd.de") or via E-mail ("deutsche.welle@dw.gmd.de").

To get started contact Peter A. Stabusch, Programme Distribution, at (tel) 49-221-389-2797 or (fax) 49-221-389-2777.



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NOTE: Requires SA D9222 IRD with dish typically 2.4 to 3m. IRDs available through SPACE Dealer Members & Telsat Communications.

SPACE PACIFIC PROGRAMMING: Ph. 64-9-406-1282
Fax: 64-9-406-1083 • POB 30, Mangonui, Northland, NZ

WITH THE OBSERVERS

AT DEADLINE:

SF has been advised as this issue goes to press to "expect a new delay, until early November, for AsiaSat 2 launch" because of a new concern about Long March 2E readiness.

Brian Rasmussen's (Manjimup, WA) report of an Indian service believed to be originating through a satellite at 80E now appears to be at 83.5E and is identified as new Indian programmer BITV. The programming is a strange mixture of western (in English) movies, Hindi (including a live newscast) and other unidentified languages. Brian says the programming starts at approximately 10PM WA time and is preceded by Moscow 1's test card which certainly identifies the uplink site! He rates the video as P4 but the audio is "scratchy" with distinctly different video quality levels when programmes change. Look at receiver IF of 1265 in 1/2 transponder format. Still a mystery - the satellite identity as none with southern hemisphere 'big signal' capability should be here. One guess: The Russians have their first Indian-Pacific Express class bird operational and forgot to tell anyone about it. The 1265 IF fits the Quasi-Global footprint for Express (see SF#10, p.5).

Brian Oliver at the University of Auckland 7.3m dish system recently shifted his observing hours to improve the University's knowledge base concerning available transmissions between approximately 8PM and 8AM (NZT). Amongst his observations: RAI Uno News on 180E at 1800UTC, Russia's internal "Number Two" programme on 145E (IF 1275), and the English language ABC Manila feed in clear to air analogue on 130E (IF 1375). SF reported this service had switched from FTA analogue to SA digital (SF#10, p.20) and this was confirmed by Rimsat. Now it appears for reasons unknown, the service is back to analogue.

Mark Marfell at Kiwi Cable updates on their testing using a 16m (!) dish for US domsat MPEG signals at their Paraparumu site near Wellington. As we noted in SF#11 (p.24), the 16m has at our July deadline producing P5 grade analogue signals from several Satcom C1 (137W), C4 (135W), C3 (131W) and Galaxy 1R (133W) and 5 (125W) transponders; both FTA and analogue encrypted Videocipher services (Kiwi cable was able to get "test authorisation" for their GI DSR 1500 receiver for the tests and this allowed the encrypted Videocipher services to be seen). Post-SF#11 deadline testing has also revealed very high quality P5 Digicipher signals from Request (pay per view) TV (C4 TR2) and Viewers Choice (TR18). For a more elaborate look at the commercial possibilities of this, see Coop's Technology Digest for August 18.

Observer **Harald Steiner** (Tokyo) reports the PAS-2 Sylmar test card at receiver IF of 1400 is P5 but the Orient Communications English / Mandarin service (IF 1034) is a weak P1 on his 60cm dish. That the Orient signal should be so significantly weaker than the test card may suggest another explanation for the widespread reports of Orient reception in the (south) Pacific (see report, p.24 here).

Hiroyuki Nagase (Asia Satellite Media Study Group, Yokohama-City) confirms SF#11 reports on Ku service that can be received on 1m and smaller antennas in Japan: 177W (10.980, vertical; 11.015, NBC News vertical; 11.510, CNN vertical); 180E (11.480, CBS horizontal; 11.510, [US] ABC horizontal); 145E (11.525, Sakha TV with subcarrier audio on 7.0).

Numerous readers have supplied information concerning satellite dish restrictions (see SF#11, p.22) in Australia and the information is now being consolidated into a report by SPACE Pacific. As **Alek Zapara** in western Australia notes, "Galaxy MMDS take-up in the Perth market has been far stronger than elsewhere in Australia and where people are unable to receive the MMDS service signals, they are queuing up to have DTH service. This will create significant new pressures for home style dishes throughout this portion of Australia." **Leon Senior** in Victoria adds, "There is an attempt underway to make uniform the various proposed council restrictions on antennas for all of Victoria. We have been working with the various groups to make the standards apply in a common-sense manner. For example, the negotiated compromise suggests that no permits will be required for antennas up to 90cm in size located at any point on a property or for antennas larger than this if they are situated so as to not be seen from the front (street side) of a house. Antennas larger than 90cm that can be 'seen' would require permits. If something like this ultimately is adopted Victoria-wide, it will at least establish the ground rules and it could serve as an example to other councils outside of Victoria." SF continues to urge that readers keep us advised of antenna restriction proposals.

Ron Boyce (Alexandra Hills, Qld) reports in detail on a commercial challenge that is currently concerning home dish dealers in Australia. An Optus distributed service (TV Oceana on A3, 1344 IF) that normally uses B-MAC encryption and

WITH THE OBSERVERS: Reports of recent changes in satellite operations, programmer sources, equipment changes are encouraged from readers / observers throughout the Pacific Ocean Region (POR). Information shared here is a valuable asset in increasing our collective understanding of the satellite system 'universe'. Off-screen photos are easily taken: Use ASA100 speed film, adjust TV set to slightly higher brilliance and lower contrast than normal, set camera to f.3.5 to 5. Set shutter speed to 1/15th second (PAL or SECAM), 1/30th second for NTSC and hold camera steady or mount on tripod. Alternately, any speed VHS, in any format, may be submitted to SatFACTS and we will shoot the photos for possible use here. You may use the reporting 'card' found on pages 29/30 in this issue (top of page), or FAX us your reports to 64-9-406-1083; individual reports can only be acknowledged by way of appearing here. Next deadline: September 2.

charges A\$80 per month has been FTA for several weeks. TV Oceana claims to have exclusive rights in Australia to redistribute Japanese (NHK and other) programming. Their primary clients are motels and hotels which cater to Japanese tourists; a "TV from home" type of service to tourists. When NHK appeared on PAS-2 C-band (IF 1115) FTA many Australia (and elsewhere including New Zealand) home dish dealers immediately began selling private dish systems tuned in to NHK's service. This PAS-2 service only recently became possible after a change in Japanese law which now permits NHK, the national internal network, to distribute its programming world-wide. On PAS-2, the service (approximately 10 hours per day) is primarily intended for US cable and Ku DTH operators which pick it up off of PAS-2 or through a subsequent US domsat relay. TV Oceana is unhappy with this FTA service and has been putting pressure on Queensland home dish system dealers not to offer it. Early on, TV Oceana incorrectly claimed that the FTA signal of NHK was "illegal" in Australia; nonsense of course. Boyce

Pacific + Indian Ku Services

While many Ku band services are well publicised, other are not. What follows is a listing of those lesser-known Ku services receivable in at least a portion of the Pacific and eastern Indian ocean regions.

177W: Spot to Japan on 10.985, 11.015 and 11.510

180E: Spot to Japan, Asia on 11.135, 11.480 and 11.510

177E: Capable of spot to Japan, Asia, USA within 10.95-11.2, 11.45-11.95 or 12.5-12.75

169E: (PanAmSat) recently active on IFs 1030, 1400

145E: Asia boresight on 11.525

130E: (Rimsat) China boresight on 11.525

96.5E: 11.525 central CIS boresight

91.5E: Spots to Japan-China, western Mediterranean within 10.95-11.200, 11.450-11.700

90.0E: 11.525 central CIS boresight

80.0E: 11.525 central CIS boresight

78.5E: (Thaicom) 12.55-12.75 Thailand boresight

71E: GALS high power (56 dBw) 11.7-12.5 Taiwan boresight

66E: 11.45-11.95 middle east boresight (digital)

63E: 10.975-11.2 boresight eastern Mediterranean

and others report that TV Oceana has put pressure on newspapers in the area to not accept advertising from the dish dealers if the dish advertising mentions "NHK" in any form. Oceana insists its "exclusive contract" to redistribute NHK prevents others from offering this service. Dealers are concerned that NHK may "correct" this situation by encrypting the PAS-2 feed; certainly one (of several) possibilities. It is suggested that until JCSAT-3 becomes functional (see p.6, here), this situation is not likely to change much.

The big event in August will be the activation of Optus B3 (156E). To recap:

1) Galaxy's present GI Digicipher services (TR10, 11H on B1) will be phased out and replaced with Pace/Irdeto service from B3; transponders unknown but high performance beam is a certainty (TRs 9-15, horizontal). Galaxy says they will begin testing "as soon as practical after 15 August" (SF#11, p.23).

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Tel: (66) 2-917-4247 Fax: (66) 2-917-4246

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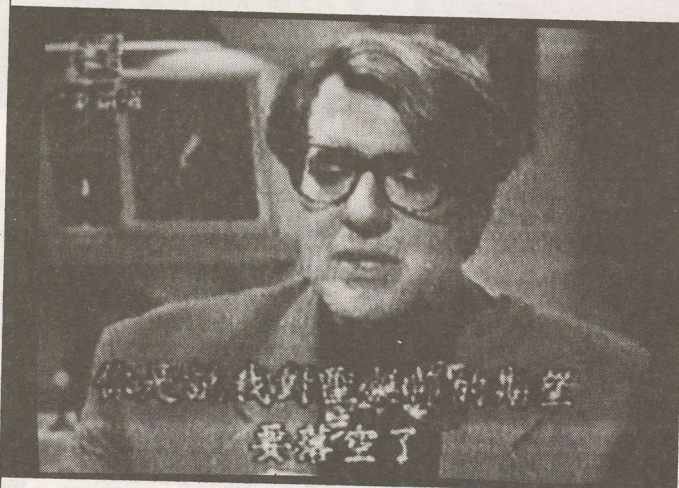
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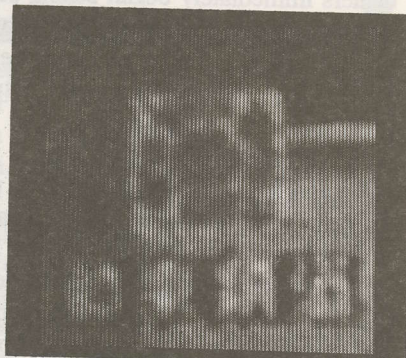
FAR NORTH CABLE TV LIMITED
PO Box 30 • Mangonui, Northland • New Zealand
Tel: 64-9-406-1282 • Fax: 64-9-406-1083

PanAmSat's Unexpected Ku Band "Leak"

As SF first reported in June (p.22) a Mandarin subtitled English language cable television service channel is now operating on PAS-2 Ku with a receiver IF of approximately 1034 MHz. This (presently) analogue signal originates at this time at the PanAmSat Sylmar (California) uplink on behalf of Orient Satellite Communications, Inc. The firm plans as many as five separate programme channels, intended for cable and SMATV headends in Taiwan and Asia (SF#11, p.2). What is of interest



here is that this China beamed signal is viewable (P4) in western Australia (Perth region) on dishes in the 1 to 2m range, in Sydney on dishes in the 3m range (P3), and in New Zealand on dishes in the 3.7m range (P3). In theory, this should not be and it now appears PAS-2 has an unintended "leak" on



at least this one Ku band transponder throughout its LOS (line of sight) coverage region. The photos here were taken in Auckland on a 3.7m dish (right hand photo is close-up of the 'ident logo' that appears at most times in upper left hand corner). The audio is clean (6.8 MHz subcarrier) even with P2 range pictures. Why the leak? Or is it a "leak" unique to this transponder? Enthusiast **Robin Colquhoun** suggests we look at the experience in South Africa where European Astra satellite reception, well off of central Europe boresight, has been a known anomaly for several years. There, 3.7m range quality Ku rated dishes routinely produce clean video and audio. This would not totally explain the stronger reception reported from western Australia but there is another possibility as well. Western Australia, near Perth, is equatorial-antipodal to the PAS-2 China beam boresight; i.e., it is located south of the equator precisely as many degrees south and (degrees east) as the boresight is north of the equator. Think of this as a giant reflection in the sky; a "mirror image" footprint hot spot appearing in the opposite hemisphere (i.e., southern) to the real boresight in the northern hemisphere. Additional reports are solicited.

2) Optus B3's SE beams (that now spill into New Zealand, especially on TRs 5 and 7) are predicted to be lower in level into New Zealand than the present A3 levels. Optus predicted contours are often incorrect; New Zealand reports from SF readers are essential to properly assess this change.

3) Transponder shuffling, with present A3 and B1 users being reassigned to new transponders on B1 and B3, are not yet announced (some say not yet completely planned); write down what you see, and report it to SF.

4) Galaxy's DTH service, from B3, will expand from the present 9 channels to 13 with the addition of BBC World, CNN International, TNT / Cartoons and Asia Business News.

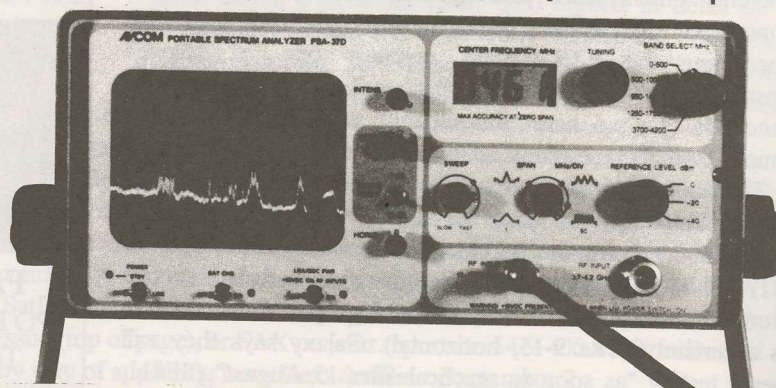
The best guess-timates as to the commercial launch date for Australian Galaxy DTH is now October 1st. Some months ago Galaxy's DTH people had insisted that DTH users must lease the complete system from Galaxy. This now seems to have softened; they say they will allow someone with an existing Ku dish system to merely add the DTH receiver from PACE to subscribe.

5) Installation firms presently being paid A\$90 per installation to put in MMDS packages report they are being offered under A\$200 for complete DTH systems. This is not exciting many installers.

Whatever you see - report it to SF (fax 64-9-406-1083)!

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NARROWBAND AUDIO / DATA RECEPTION FROM SATELLITE SOURCES

An Introduction

Not everything of interest relayed via satellite is television. In fact, of all satellite traffic world-wide today, television accounts for less than 40% of the actual transponder traffic. So what are they doing with the balance of the transponders?

Most of it would be called 'narrowband' which simply means the bandwidth used for the transmission of data (information) is, relative to television, "narrow." Whereas a full transponder may be required to send a single (analogue) TV programme (with one or more companion audio channels), in the 'narrowband world' that same transponder could be used to transmit the full information content for 3,600 'AM' radio stations. Think of it this way: Just one PAS-2 or Intelsat transponder could carry every AM radio station now broadcasting from Perth to Tahiti, with room left over for most of the AM radio stations in Japan. And that is just one transponder.

Now, if we could put up with less 'fidelity' than found in an AM (broadcast band) radio station, and narrow the individual 'stations' to channels that are 4 kilohertz wide, a single transponder could accommodate 9,000 separate transmissions simultaneously. A 4 kilohertz (kHz) channel just happens to be the bandwidth used by telephone companies world-wide to link your telephone calls from point 'A' to point 'B'. That means that a single satellite transponder can carry 9,000 simultaneous telephone conversations or other data links.

Surprise. This is precisely what one finds on all of those non-video transponders for Intelsat (177W, 180E, 177E and 174E). Tens of thousands of narrow band voice and data traffic channels most of which operate 24 hours per day interconnecting Perth to Tokyo, Papeete to New Caledonia, Auckland to New York. Of course all of these transmissions are somehow encrypted and the equipment to tune them in is restricted to authorised personnel and costs a million dollars; right? **Wrong.**

Step One

There are three basic techniques for the creation of (analogue) transmissions that are relayed via satellite as "narrow bandwidth" circuits. If you own a TVRO system with a tuneable audio subcarrier detector, you

already have the tools in front of you to enjoy one of these techniques; subcarrier audio.

Every TV video transmission that uses standard analogue formats (whether PAL, NTSC or SECAM) sends the sound portion along with something called a subcarrier. This means the sound is piggybacked to the video as an appendage and you receive it by tuning a separate audio receiver designed to operate over the frequency range defined for satellite subcarriers; 5 to 9 MHz typically. You can test this by placing your dish on Intelsat 180E, tuning in the Worldnet transponder (IF 1180), and then adjusting your TVRO receiver for minimum audio bandwidth. Now tune the receiver through the 5 to 9 MHz region and you will find several non-TV programme-audio (radio) channels. With this simple system, the audio will be weaker (softer) than the regular programme audio. What you are tuning in is the Voice of America (VOA) Asian language feeds which are riding 'free' piggy back fashion on Worldnet on their way to various VOA short-wave transmitters in Asia.

Now tune to CNN on PAS-2 and tune your audio to around 6.4 and 7.5 MHz. If it is quiet, just wait a few minutes. You may be surprised.

This is the tip of the tip of an iceberg which we will begin exploring in the next issue of SatFACTS. You start off with a standard TVRO and build upon that to discover a fascinating world of narrowband transmissions that have been right there in front of you, but ignored until now.

After the subcarrier world of narrowband material, we have two separate techniques that require some special (although not terribly expensive) equipment to tune in. One of these techniques treats each satellite transponder as a dedicated bandwidth that always starts at 0 megahertz and ends at 27, 36, 40 or 54 megahertz. Inside of this dedicated bandwidth, various techniques are used to create transmission spectrums which can then be filled with a wide variety of narrowband services. Think of it this way: In the real world there is one radio spectrum that starts at 0 megahertz and extends to 27 megahertz. In the satellite world, each individual transponder has its own spectrum space that also starts at 0 and extends to 27 (or, 36, 40 or 54). If a particular satellite has 16 transponders and each is 27 MHz wide, in this satellite world you now have 16 times

27 MHz or 432 total megahertz of space to fill with anything you wish. And they do. And you can tune it all in with relatively modest equipment. What will you find? Everything from radio station programming to (very!) personal telephone calls, news text and market services, airline air to ground relays, credit card

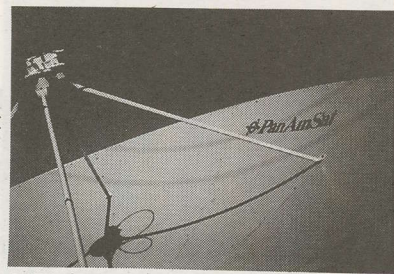
verification circuits - in short, just about everything you might find in any other portion of the spectrum, only it is all rolled out nice and neat for you a transponder at a time, satellite by satellite.

Join us for the adventure launching in SF#13.



**YES - THEY
REALLY DO
EXIST!**

SF reported in issue 10 (p.22) that PanAmSat was funding the give away of one thousand 3.1m C + Ku band dishes (value each: more than A\$2,000) to "motels, hotels, SMATV and cable TV systems throughout Australia and SE Asia." We gave a telephone number and person to contact. Many of you called and were told various reasons why the dish you were requesting could not be approved. A select few had their applications taken and sent on to PanAmSat for approval in Connecticut. Almost nobody has heard anything since.



Well, they do exist as these photos show; we subsequently tracked down a total of 3 in New Zealand. Where the other 997 have gone is anybody's guess. The petalised all metal dishes are nicely made (by a reasonably well known US manufacturer) and the one shown in this photo was anchored on PAS-2 for evaluation when we came across it. In side by side testing with a well known brand 3.7 metre mesh antenna, it was holding its own. We were told assembly required "about an hour's time" but the guy who said that puts antennas together for a living and could probably do it blindfolded after downing a fifth of rum.

brand 3.7 metre mesh antenna, it was holding its own. We were told assembly required "about an hour's time" but the guy who said that puts antennas together for a living and could probably do it blindfolded after downing a fifth of rum.



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SatFACTS PACIFIC OCEAN ORBIT WATCH: 15 August 1995

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IF Freq
1,475
1,425
1406/1425
1,375
1346/1372
1,325
1288/1300
1,275
1235/1249
1,225
1161/1183
1110/1115
1038/1060
998/985

Gz25/103	G1/130	Gz18/140	G2/142	Gz21/144	P169/Vt	P169/Hz
DubITV	RAJ(X2)	DubITV	ATN	DubITV		
Muslim	SunMovie	Muslim	JJAY			
					CMT/CBS	ABN/CTN
APNA	ABC-5		CellFone			
					MTV/b	Discov/b
	AsiaNet		EagleNet			
					ESPN/b	OccVid
	(vacant)		EMTV	Moscow 2		
					P2/Sylmar	AsiaFeeds
	SunMusic		Udaya			
					Prime/d	CNN (X2)
						NHK
					ANBC	Fil.Ch/d
					TNT/Car/b	(data)

IF Freq	180/RH	180/LH
1,432	Keystn	
1,388	VDP	
1,325	MPEG	
1,310	MPEG	
1,277	NBC	
1,256	Keyston	
1,223	CBS	
1,179	W'Net	
1,137	NHK	
1,105	RFO	1092/data
1,054	(data)	Canal +/d.
1,021	Aust 9	Aust.9
988	NZ/dig.	
980	NZ/dig.	
972	NZ/dig.	
964	NZ/dig.	

August 1995 NOTES

- ▶ /b is B-MAC (NTSC or PAL depending upon service)
- ▶ /d or /dig. is some form of digital (MPEG)
- ▶ Intelsat I180 includes right and left hand circular transmissions (separate)
- ▶ VDP indicates vidiplexed transmission(s); 2 video on same transponder requiring Vidiplex decoder for separation (available in marketplace)
- ▶ (X2) indicates 1/2 transponder format with typically two programmes present
- ▶ Ku IF's for A3 and B1 satellites (below) are for standard LNB LO of 11,300

ANBC indicates reception on 3m or smaller antenna **TNT/Car** indicates subscriptions available/SF#10, p.18

I177E/I174E

IFs of 984 & 963 carry many international news feeds in right hand circular; on I177E, IF of 973 carries AFRTS in B-MAC, left hand circular with AFRTS radio subcarrier. Both birds also loaded with narrowband carriers.

Ku BAND ACTIVITY UPDATE

A3/B1TR	IF Freq
1(V)	977
5L(V)	1,193
5U(V)	1,218.8
7L(V)	1,344
7U(V)	1,370
10(H)	1,075.75
11(H)	1,138.5

A3/B3: 155.9E	B1: 160.0E
	Tab radio; data
ETV>0000UTC	Occ.Video, news
	Occ.Video
TVO>1200UTC	ABC Nation /b
	SBS Nation /b
B1: Digicipher Ch. 0,1,2,5,6,(7)	
B1: Digicipher Ch. 0,1,2,5,6,(7)	

Satellite	RF Freq
PAS-2	12,334
PAS-2	12,700
177W	10,980V
177W	11,015V
177W	11,510V
180E	11,480H
180E	11,510H
145E	11,525H
130E	11,525H
96.5E	11,525H

Coverage Beam	Service Report
NE Asia	Orient Comm.
NE Asia	PAS-2 Sylmar
Japan, Asia	US Net feeds
Japan, Asia	NBC News
Japan, Asia	CNNI
Japan, Asia	CBS
Japan, Asia	(US) ABC
Asia	Sakha TV
Taiwan, China	(Cable pgming)
Asia	Active ??

Expect massive reshuffling of Optus assignments during next 45 days with B3 replacing A3 at 155.9E followed by many B1 services shifting to B3. Galaxy pay-TV service will move to B3 and convert from GI Digicipher to NTL/Pace/Irdeto conditional access format. Many established A3 and B1 services will also move between the two satellites; reports solicited. Data in right hand box may not apply to your location but you will never know until you look with your own system to see if there is signal "leaking" your way.

SatFACTS DATA SHOPPE

YOUR Source For Reference, Study Materials In The World Of Satellite TV

ENTRY LEVEL:

SATELLITE TELEVISION: All You Need To Know. Brand new (August 10th) 28 page booklet with four-colour cover designed to help you educate potential customers about the joys of owning a home dish system. Sold through SPACE Dealer Members at \$10 to individuals. Single copies available via fast post within NZ (NZ\$10) or elsewhere (US\$10) using order form on page 29 here.

TB9402 / **MATV: Master Antenna Television Systems.** How to plan, select equipment for and install multiple outlet systems for motels, hotels, apartment flats and condos. Practical step by step guidance. Price: NZ\$20 world-wide.

TB9404 / **Home Satellite Systems.** What the parts are, how they go together for POR home TVRO systems; how you create a working system with maximum performance at minimum outlay. Price: NZ\$20 world-wide.

TB9405 / **Commercial Satellite Dish Systems (SMATV).** If you are building a system from scratch, also order TB9402 for the MATV portion basics. If you are rebuilding an existing MATV system to add satellite signals, you need this! Price: NZ\$20 world-wide.

■ ALL 3 (TB9402, 9404, 9405) as a package for NZ\$40 (you save \$20).

DISH OWNING ENTHUSIAST LEVEL:

Coop's Satellite Operations Manual. Originally written 1980, this manual explains how you locate and interpret the multitude of wide and narrow band signals available via satellite. Dozens of fun, new ways to get more from your dish system. Price: \$NZ30 world-wide.

Gibson Satellite Navigator (O/w 1980). The mechanics of the Clarke Orbit Belt, how a dish tracking system is designed and operated to allow full horizon to horizon reception with a motorised dish system. Very practical, very hands on with plenty of do-it-yourself instruction for inexpensive systems. Price: NZ\$30 world-wide.

Coop's Basic Manual on Fine Tuning Satellite Terminals (O/w 1980). The little things such as feeds, connectors, powering. Tips from the people who started home dish reception in the 1970s, building the foundation for the present TVRO industry day by day, discovery by discovery. Very practical, very hands on. Price: \$NZ30 world-wide.

■ ALL 3 (Two from Coop, one Gibson) as a package for NZ\$70 (you save \$20).

BUSINESS MANAGEMENT REFERENCE MATERIAL:

CTD 9412 / StarNET TV Wants To Put You In The Cable TV Business. When AsiaSat 2 is launched this year, StarNET's 7 free to air (plus 35 pay TV) services are designed to make you a cable TV operator. Price: \$NZ30 world-wide.

CTD 9503 / COPYRIGHT - How It Works, Your Liabilities. Must reading for anyone planning to distribute satellite programming to motels, hotels, communities. Price: NZ\$30 world-wide.

CTD 9504/ GALAXY - The detailed, inside story of what it is, where it wants to go. If you are hoping for Ku-band DTH in Australia and New Zealand, Galaxy is the most promising programme provider. Price: NZ\$30 world-wide.

SatFACTS AUGUST 1995 POR OBSERVER REPORTING FORM

(Please FAX [64-9-406-1083] or mail to arrive by 01 September)

TELL US what you are seeing, or using for equipment, that is new within the last 30 days. Observer reports (see "With The Observers" page 22) form an important part of the growing body of information we all share monthly.

• NEW programming sources seen since 1 August: (Please list receiver 'TF' or satellite transponder number if known) _____

• CHANGES in reception quality since 1 August: _____

• EQUIPMENT changes at my observing terminal since 1 August: _____

■ My Name _____ Address _____
Town / City _____ Country _____ (Please turn form over)

ENTER AIRMAIL SUBSCRIPTION to SatFACTS HERE for direct airmail service to you!

Enter my 12 month subscription to SatFACTS Monthly starting with September 1995 issue. My NZ\$40 (within New Zealand), US\$40 (outside of New Zealand) is enclosed.

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Payment and card to: SatFACTS, PO Box 330, Mangonui, Far North (New Zealand)

SatFACTS DATA SHOPPE ORDER FORM

I wish to order the following reference materials (see description page 30):

- SATELLITES: All You Need To Know** (\$10 inside NZ, US\$10 elsewhere; description p.17)
- TB9402 / MATV** (NZ\$20; SPACE Members \$15).
- TB9404 / Home Satellite** (NZ\$20; SPACE Members \$15).
- TB9405 / Commercial Satellite** (NZ\$20; SPACE \$15).
- ALL THREE / TB9402, 9404, 9405** (NZ\$40; SPACE \$30)
- Coop's Satellite Operations** (NZ\$30; SPACE \$20) .
- Gibson Navigator** (NZ\$30; SPACE \$20).
- Coop's Basic - Fine Tuning** (NZ\$30; SPACE \$20).
- ALL THREE / OPERATIONS, NAVIGATOR, BASIC** (NZ\$70; SPACE Members \$50).
- CTD 9412 / StarNET Wants To Put You in Cable TV** (NZ\$30; SPACE Members \$20)
- CTD 9503 / Copyright As It Applies to Satellite Reception** (NZ\$30; SPACE Members \$20)
- CTD 9504 / GALAXY: The Inside Story** (NZ\$30; SPACE Members \$20)

Instructions:

- Check off items you wish airmailed to you
- Make cheque to Far North Cablevision Ltd.
- Complete reverse side of card

■ YOUR equipment survey:

Size dish(es): _____; Noise Temp LNB(s): _____

Make/model receiver(s): _____

Make/model standards conversion: _____

■ Friends with dishes (Will be sent literature explaining SPACE):

If mailing, to: SatFACTS Observers, PO Box 330, Mangonui, Far North, New Zealand

ARE YOU A MEMBER OF SPACE?

Joining **SPACE Pacific** is a logical extension of your interest in satellite-direct reception and distribution services. **SPACE** members enjoy special discounts on publications and materials, receive a membership newsletter, are entitled to first 'pick' for various annual South Pacific Region Satellite & Cable Show functions and lodging. Commercial members of **SPACE Pacific** (there are four levels of membership:

You select the one that best suits you) have first choice of exhibit hall spaces at SPRSCS and all members participate in research and development projects to the benefit of the industry. To receive a no-obligation 'Invitation To Join SPACE Pacific', complete and return this card.

My Name _____

Company (if applicable) _____

Mailing address _____

Town/city _____ (state/code) _____ Country _____

Return to: **SPACE Pacific**, PO Box 30, Mangonui, Far North, New Zealand

Instructions to Order from SatFACTS Data Shoppe:

- From anyplace in world: Enclose payment in NZ\$, or, in US\$ at rate of \$1NZ = 64 cents US (total in NZ\$, multiply by .64) to Far North Cablevision Ltd., PO Box 330, Mangonui, Far North, New Zealand
- Complete your own ship-to information below.

Total amount of order (add items ordered on reverse side of this card): NZ\$ _____
(If paying in US\$, multiply .64 times NZ\$ number for total)

Ship to:

Name _____

Address _____

Town / City _____ Country _____

IF Member of **SPACE Pacific**: Your membership number (found on membership certificate) _____

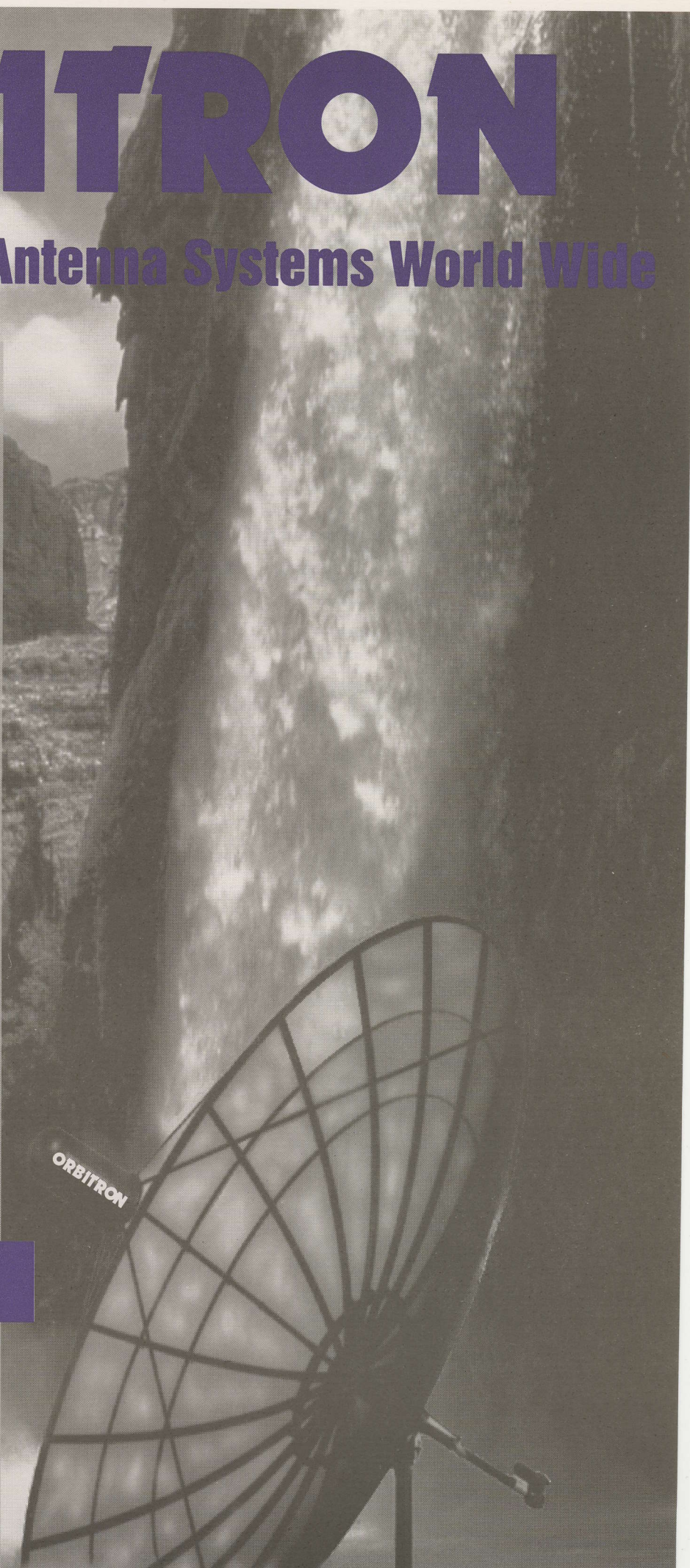
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