



TECHNICAL OPERATIONS

Table of Contents

Table of Contents.....	1
Quick Reference	1
Important Information.....	2
Program and Data Delivery by Satellite	3
IDC Receiver / Receiver Control Unit Installation Guide	4
<i>Introduction.....</i>	<i>4</i>
<i>Preliminary to Installation.....</i>	<i>6</i>
<i>Receiver Preparation and Authorisation</i>	<i>7</i>
<i>RCU Data Ports.....</i>	<i>11</i>
<i>Tips for Automation systems</i>	<i>13</i>
Receiver Configuration	15
Troubleshooting Guide.....	16
Dish Alignment Checks.....	17
Procedure for Returning Equipment.....	18
Glossary.....	19

Quick Reference

- Ku Band
- Optus D2
- Transponder 1
- Vertical polarisation
- Main carrier downlink frequency = 12298.5700 MHz
- Main carrier IF frequency = 998.5700 MHz
- International Datacasting SR260/QFR
- Norsat PLL LNB recommended (stability +/- 25 kHz or better)



TECHNICAL OPERATIONS

Important Information

Fairfax Radio Syndication distributes quality radio programs and services, efficiently and effectively; to achieve this, overall system reliability is paramount. This is particularly important to you, the user, when your on-air presentation is placed under control of Fairfax Radio Syndication.

The Fairfax Radio Syndication receiving system, as with all electronic systems, will be sensitive to external interference and especially to severe variations within the mains supply. Accurate continuity of service cannot be guaranteed following blackouts/brownouts. Heavy mains dips or spikes may result in connected equipment being activated, causing uncontrolled and unscheduled broadcast of material; a disastrous situation when operating unmanned.

It is a common practice today, to power remote control systems with alternative power sources having mains isolating features, such as UPS.

For these reasons it is HIGHLY RECOMMENDED that the Fairfax Radio Syndication receiver, Receiver Control Unit and Digital Courier PC be powered from an UNINTERRUPTIBLE POWER SUPPLY.

There are many medium-priced UPS systems available, designed specifically for Personal Computer protection. This type of unit will provide continuous operation of the Fairfax Radio Syndication equipment during extended periods of mains problems. The total power requirement of the Fairfax Radio Syndication equipment is approximately 50VA.

WARNING

OPERATION OF ELECTRONIC EQUIPMENT INVOLVES THE USE OF VOLTAGES AND CURRENTS WHICH MAY BE DANGEROUS TO HUMAN LIFE. OPERATING PERSONNEL SHOULD OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE COMPONENTS OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH POWER ON UNLESS PROPER PRECAUTIONS ARE OBSERVED.



TECHNICAL OPERATIONS

Program and Data Delivery by Satellite

Fairfax Radio Syndication uses the most technologically advanced, fully secure, digital audio delivery system available. The IDC FlexRoute system is fully digital and uses the industry standard ISO/MPEG Layer II Musicam compression coding for CD-quality transmission over satellite circuits. For stations receiving live and pre-recorded programs via our satellite system the benefits are:

- Quality delivery
- Lower overheads
- Less equipment wear and tear
- Less maintenance

The Fairfax Radio Syndication Satellite System Offers

- Digital 20 kHz stereo delivery
- Circuit assigning, start & stopping of tape decks for pre-fed material
- Data transmission to a printer for APRA reports, music logs, AAP news copy
- Improved efficiency and increased program flexibility
- Full "localism" on network: news IDs, sweeps, jingles etc.

Satellite Reception – (prices are subject to change and should be confirmed prior to ordering).

Satellite antenna - price varies depending on location	2,400.00
IDC Receiver – SR260/QFR	5,500.00
Low noise block converter (Norsat Model 1112B)	1,280.00
Fairfax Radio Syndication Receiver Control Unit (RCU)	1,200.00

Installation and delivery - price varies depending on location. All prices include sales tax and exclude freight charges.

Satellite weekly delivery fee	120.00
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TECHNICAL OPERATIONS

IDC Receiver / Receiver Control Unit Installation Guide

Introduction

These notes describe the installation and operation of the Fairfax Radio Syndication Network receiving equipment, comprising the digital audio satellite receiver produced by International Datacasting Corporation of Canada and the purpose-built control interface, the Receiver Control Unit (RCU).

The Fairfax Radio Syndication system uplinks on four carriers, each capable of four multiplexed quality digital audio channels. The transmission technique is Single Channel Per Carrier (SCPC), sharing a satellite transponder optimised for this purpose.

The transponder is Number 1, on Optus Satellite 1, B-series. Transmission from this transponder covers Australia and New Zealand. Fairfax Radio Syndication reception requires a Low Noise Block Downconverter, LNB, PLL type.

It is recommended that users familiarise themselves with the User's Guide for the IDC SR260/QFR Digital Audio Satellite Receiver, which is included in the receiver packaging. A system overview and performance specifications are contained within this handbook, together with a comprehensive troubleshooting section, should difficulties arise.

The Receiver Control Unit (RCU), provides a flexible interface between the receiver and the user's station equipment. Audio from the receiver is routed through the RCU and supplied to the user via two output ports.

The MAIN OUTPUT will always be configured to supply the correct audio feed for TRANSMISSION purposes. To provide maximum flexibility we recommend both MAIN and AUXILIARY channels are wired through to all on-air and production studios; and, if applicable, your automation system.

The internal configuring of these outputs is controlled from Fairfax Radio Syndication via a command data channel, the particular mode being dependent on the program format, channel usage, stereo, mono, dual mono etc.

The Receiver Control Unit (RCU) also provides a number of relay contact closure outputs to control station equipment for local insertion of material into Fairfax Radio Syndication program presentations.



TECHNICAL OPERATIONS

The Fairfax Radio Syndication system provides the "News Maker" wire service which is supplied to authorised recipients through a serial port. If you wish to save paper, a PC terminal running TELEX or other suitable software, connected to the serial printer port can maintain a continually updated news information data base.

A second serial data port is provided for controlling additional hardware options to be available for users in the future.

The RCU has been designed to operate automatically with no internal or external user adjustments. A facility for remotely testing individual units, is also included.

TECHNICAL OPERATIONS

Preliminary to Installation

Antenna Requirements

Existing antenna dishes (2.8m) will be suitable for reception of the digital service. SCPC receivers demand input RF signals to be tightly controlled in frequency, which requires highly stable conversion within the Low Noise Block Converter (LNB) of the antenna.

LNBS used for television reception do not generally meet this requirement. For reliable performance, LNB Local Oscillator stability must be better than $\pm 25\text{kHz}$, which is usually achieved only in LNBS based on phase-locked-loop design. Check your LNB and if required replace with a PLL type. The LNB can usually be replaced without upsetting the feed focus. Use this opportunity to have your antenna system checked out for overall alignment, including pointing, focus and polarisation (vertical), and the condition of the lead-in cable and RF connectors. If you wish to provide split antenna feeds to the IDC receiver or other receivers, don't forget to isolate the LNB power feed from one or the other receivers, using a splitter with DC-isolation.

Unpacking and Contents

The IDC Receiver and Fairfax Radio Syndication Receiver Control Unit (RCU) are shipped in separate packaging. The contents of each box are as follows;

Receiver Box

- IDC SR260/QFR Digital Audio Satellite Receiver
- Australian/IEC Mains Power Cord
- User's Guide
- Frequency DIP-Switch Setting Notes/Warranty card
- Phase-Lock-Loop LNB, (if ordered)

RCU Box

- Receiver Control Unit/Australian/IEC Mains Power Cord
- Data Interconnect Cable, DB9F-DB9F
- Audio Cables (2), XLR-F to Open-end/6-way Phoenix terminal block
- 2-way Phoenix terminal block/Installation Notes, (this document)

TECHNICAL OPERATIONS

Receiver Preparation and Authorisation

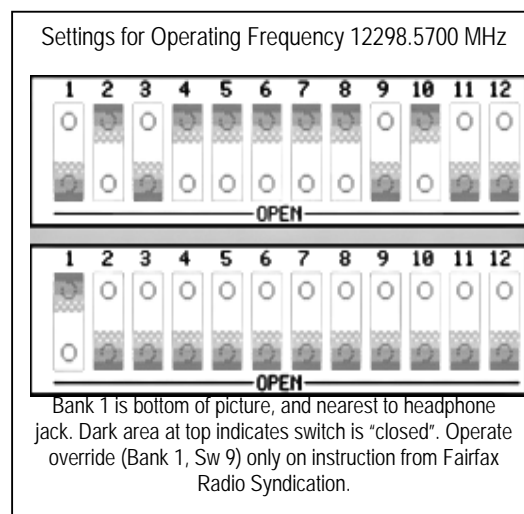
First contact Fairfax Radio Syndication on (02) 9930 9853 to confirm if authorisation is required. Where possible, we will test and authorise your receiver for you. If authorisation is required, follow the instructions following. Read the IDC Receiver User's Guide, particularly Sections 2-4.2 to 2-4.4, which describe the setting of the DIP Switches located on the base of the unit and the initial installation procedure. The switches have been set to Fairfax Radio Syndication's reference frequency, prior to shipping. Check the settings against the Frequency/DIP-Switch notes.

USUALLY YOUR RECEIVER WILL BE PRE-AUTHORISED FROM FAIRFAX RADIO SYNDICATION AND READY FOR USE.

IF YOU DO NOT RECEIVER LOCK (GREEN) FOLLOW THIS PROCEDURE:

- 1) ENSURE THAT 'OVERRIDE' DIP-SWITCH 9, ON BANK 1, IS IN THE 'ON' (CLOSED) POSITION. (BANK 1 CLOSEST TO THE HEADPHONE JACK).
- 2) SET THE DIP SWITCHES AS PER THE PICTURE (excluding SW9 bank 1)
- 3) UPON RECEIVING LOCK, RETURN DIP-SWITCH 9 ON BANK 1 TO OPEN.

The receiver should be rack mounted. Connect the antenna feed to the receiver and power up. When you are satisfied that the LOCK LED is steady on GREEN, contact Fairfax Radio Syndication to confirm authorisation and test the receiver. If the LOCK LED flashes between RED AND GREEN or is steady on RED, check the antenna system. Authorisation will be indicated by the CH1 and CH2 Audio LED's illuminating GREEN. Refer User Guide Section 2-4.5, 'CH1 and CH2 Indicators' for an explanation of the various LED indications presented. After authorisation, 'Override' Switch 9 is to be set to OFF, (OPEN).





TECHNICAL OPERATIONS

Receiver and RCU Interconnection

The IDC Receiver and RCU should be rack-mounted together so that the supplied interconnecting cables can be used. The data cable (DB9-F to DB9-F) is connected between the ANC/AUX port on the rear panel of the receiver and the SERIAL-IN port of the RCU. The cable may be connected either way around.

Audio connections between the receiver and RCU are via the supplied leads with the XLR connectors at one end, and the 6-way Phoenix terminal block, to be fitted to the other. The terminal block connections are indicated on the RCU rear panel, extreme left, marked, RX AUDIO IN. Cable colour code and Connector pin-outs are:

XLR Connector		
Open End		
Pin 1 - Ground	=	Shield
Pin 2 - (+)	=	White/Clear
Pin 3 - (-)	=	Black

Take care when wiring to Phoenix connectors. An unreliable connection may result if the holding 'grip' is not fully retracted before inserting the wire and tightening down the screw.

RCU Audio Ports

Audio for TRANSMISSION will always be output from the terminals marked, MAIN OUTPUT. Audio for RECORDING (store and forward, or other applications) will be output from the auxiliary terminals, AUX OUTPUT. Connections to these ports are hardwired using the 12-way Phoenix terminal block provided, as indicated on the RCU rear panel.

The MAIN and AUX audio ports are balanced outputs with a source impedance of approx. 40 ohms, and can be terminated in 600 ohms. As no switching or muting of Fairfax Radio Syndication audio is used during program breaks, users, who wish to operate unmanned and with local insertion, will need to mix the Fairfax Radio Syndication feed and their local sources in the on-air studio console.



TECHNICAL OPERATIONS

Signal formats for the RCU audio output ports are:

	Main Output (Transmission)		Aux Output (Recording)	
	A	B	A	B
Stereo Mode	Left	Right	Left	Right
Dual Mono	Mono-1	Mono-1	Mono-2	Mono-2

As shown above, when mono material is being transmitted, the RCU will supply mono signals from both A and B ports of either/or the MAIN and AUX OUTPUTS, to maintain a spatially-balanced output through a stereo transmission system.

NOTE: NOMINAL PROGRAM LEVEL FOR THE IDC SYSTEM IS +4dBu, (+4dBm/600ohms).

SUFFICIENT HEADROOM IS MAINTAINED BY OPERATING AT THIS LEVEL, IN ORDER THAT PERFORMANCE NOT BE COMPROMISED BY THE NEED TO LIMIT OR OTHERWISE PROCESS THE SIGNAL BEFORE DELIVERY.

The aim is to supply high quality program material which is as close to the original as possible. Tailoring of the audio signal to achieve a preferred 'sound' is left to the affiliate. The internal RCU audio routing circuitry operates with fixed unity gain. Users will need to provide external means for level adjustment, if required. Clipping level at the receiver output is +16dBu.

For maximum flexibility, Fairfax Radio Syndication recommends you use stereo audio distribution amplifiers to run the MAIN and AUXILIARY outputs of your receiver(s) to your on-air studios, production studio, news room (for News Maker and monitoring) and your automation system (if applicable). This also allows you to set the output level that is required by your consoles and automation system – call Fairfax Radio Syndication to arrange a tone test for alignment.

TECHNICAL OPERATIONS

RCU Control Ports

Two rear-panel sockets (DB25-M), designated CONTROL-1 and CONTROL-2 provide an interface for remote control of user's equipment. The isolated normally-open contacts of sixteen relays are accessible via these ports. Each relay is activated for 0.5 seconds on command from Fairfax Radio Syndication. The table lists the Commands, Functions and Socket Pin Outs.

Command	Function	Pin-Outs	Socket
1	Commercial Break	25,12	Control-2
2	News Intro	24,11	Control-2
3	Local Weather	23,10	Control-2
4	Sweeper - FULL	22,9	Control-2
5	Sweeper - COLD	19,6	Control-2
6	Sweeper - SPECIAL	18,5	Control-2
7	Promo ID	17,4	Control-2
8	IDP	16,3	Control-2
9	2UE / NAT News Start	16,3	Control-1
10	2UE / NAT News Stop	17,4	Control-1
11	4BC / 3AW News Stop	18,5	Control-1
12	(reserved)	19,6	Control-1
13	(reserved)	20,7	Control-1
14	Tape Start	23,10	Control-1
15	Tape Stop	24,11	Control-1
16	Top Of The Hour	25,12	Control-1

Commands 1-8 are used for controlling user's equipment to locally insert material into break periods of Fairfax Radio Syndication delivered programs. Some programs only some of these commands – refer to schedules for full details.

Commands 9 & 10 are to control a user's cartridge machine or digital storage system for recording pre-feeds of National News and the live 2UE NSW Feed.

Command 11 is for the 3AW and 4BC news end of message pulse.

Commands 14 & 15 are for controlling a second machine, bridge wired to the AUX OUTPUT, for recording other material, such as commercials, network promos etc.

Command 16 is activated on the hour, for time sync purposes. This command should be used only for time synchronisation and not for activating NEWS INTROS etc



TECHNICAL OPERATIONS

The Fairfax Radio Syndication Network Operations section of this manual gives details of the structure, timing and other information relating to various program formats and the use of local insertion control. See also the Appendix below, for a description of an example of a Four-Cartridge Machine configuration for local insertion.

RCU Data Ports

The Fairfax Radio Syndication system has the facility for distribution of data for various purposes. Future plans for this feature include distribution of scheduling information, music logs, general interest memos, survey material etc.

The Fairfax Radio Syndication "News Maker" wire service is supplied to authorised users via this facility.

A parallel printer port (DB25-F) is provided, which accepts a standard printer (Centronics) cable, typically for connection between a PC and a printer.

Two RS-232 serial ports, a common DB9-F connector; serial out. The pin-outs are non-standard, requiring a specially prepared plug. The serial out pin-outs are:

Pin 3	-	Serial Printer Port
Pin 9	-	Serial Control Port
Pin 5	-	Ground

Both ports have a fixed configuration, as follows:

Speed	9600 baud
Bits	8
Parity	N
Stop	1



TECHNICAL OPERATIONS

The News Maker service is also fed from the SERIAL PRINTER PORT.

Although the 'electrical' baud rate is fixed at 9600, data throughput for the NEWS MAKER service will be about 240 character/sec, enabling printers, parallel or serial, to be used in lieu of a PC. Remember however, since the service is continuous, paper usage will be very high. Further, few printers can cope with the throughput of the service, so a PC capture solution is desirable.

The SERIAL CONTROL channel is reserved for future purposes.

Local Insertion using Four Cartridge Machines / Automation Liner Banks

CART 1 COMMERCIAL REPLAY (COMMAND 1 - COMMERCIAL START)

This machine is loaded with commercials having a total duration not exceeding the scheduled break periods as determined by Fairfax Radio Syndication. A disk-based replay device obviously removes the limitations of cart machines for commercial play purposes.

CART 2 NEWS INTRO (COMMAND 2 - NEWS INTRO)

This machine is loaded with your station's News Intro, of duration not less than 7 seconds. The Fairfax Radio Syndication news reader always begins the bulletin at exactly 7 seconds past the hour.

CART 3 WEATHER BREAK (COMMAND 3 - WEATHER BREAK)

This cart must run for exactly 30 seconds. A generic style weather forecast applicable for multiple replays during long program sessions should be prepared. Rotating 2 or 3 tracks on the same cartridge also provides some variety.

CART 4 SWEEPER ID (COMMAND 4 - SWEEPER)

This command is activated several times per hour, in between music tracks, Ensure that each ID conforms to the exact time of 7 seconds, remembering the overlap possibilities because of the mix of the Network feed and your local content.

IT IS CRITICAL THAT ALL CARTS ABOVE ARE LOADED APPROPRIATELY FOR FAIRFAX RADIO SYNDICATION CONTROLLED OPERATION TO FUNCTION SUCCESSFULLY, OTHERWISE THERE WILL BE PERIODS OF SILENCE IN YOUR ON-AIR PRESENTATION.



TECHNICAL OPERATIONS

Tips for Automation systems

With the growing popularity of automation systems in recent years, Fairfax Radio Syndication has found stations moving away from the traditional cart-based system to PC-based playout systems.

When interfacing such a system to Fairfax Radio Syndication's music programming, the object is to provide the same flexibility as using carts, but with tighter presentation and more sophisticated commercial scheduling.

Please plan carefully the way your system will handle Sky programming. It may be worth talking to your automation system's manufacturer for advice or, Fairfax Radio Syndication could put you in touch with other stations using the same system.

From listening to feedback from stations, Fairfax Radio Syndication has the following recommendations:

- We cross-fade audio – when a SWEEPER is fired off, we will fade the song to provide a nice mix on-air, just like a live jock would do on your station. Facility should be provided for your automation system and the satellite program to mix on-air.
- Don't "sequence" events. Your system should distinguish individual commands and associate them with the appropriate event. If your system does not distinguish events, instead running as per the order of events on the schedules, one small mistake in your clocks could sound disastrous on-air. It is much better that your system handles events based on the pulses rather than being locked to a schedule.
- Be careful using windows. Sweeper placement on the schedules is approximate, as are some commercial breaks. It is better if your system is not looking for certain events within a restricted time frame.
- Make sure your system can handle side-by-side command events, ie a COMMERCIAL break then a NEWS INTRO at the end of the break.
- If you are switching between satellite and local automation, please remember your receiver will not necessarily go to silence at the end of booked programming. For that reason, your system will need to mute the audio going to air and ignore any pulses that may come in.
- Don't forget time zones! All schedules run in AEST/ADST time. While a cart based system doesn't care about the time of day, computer systems do! Time zones and daylight savings make everybody's job harder, but are a fact of life. When reporting problems to Fairfax



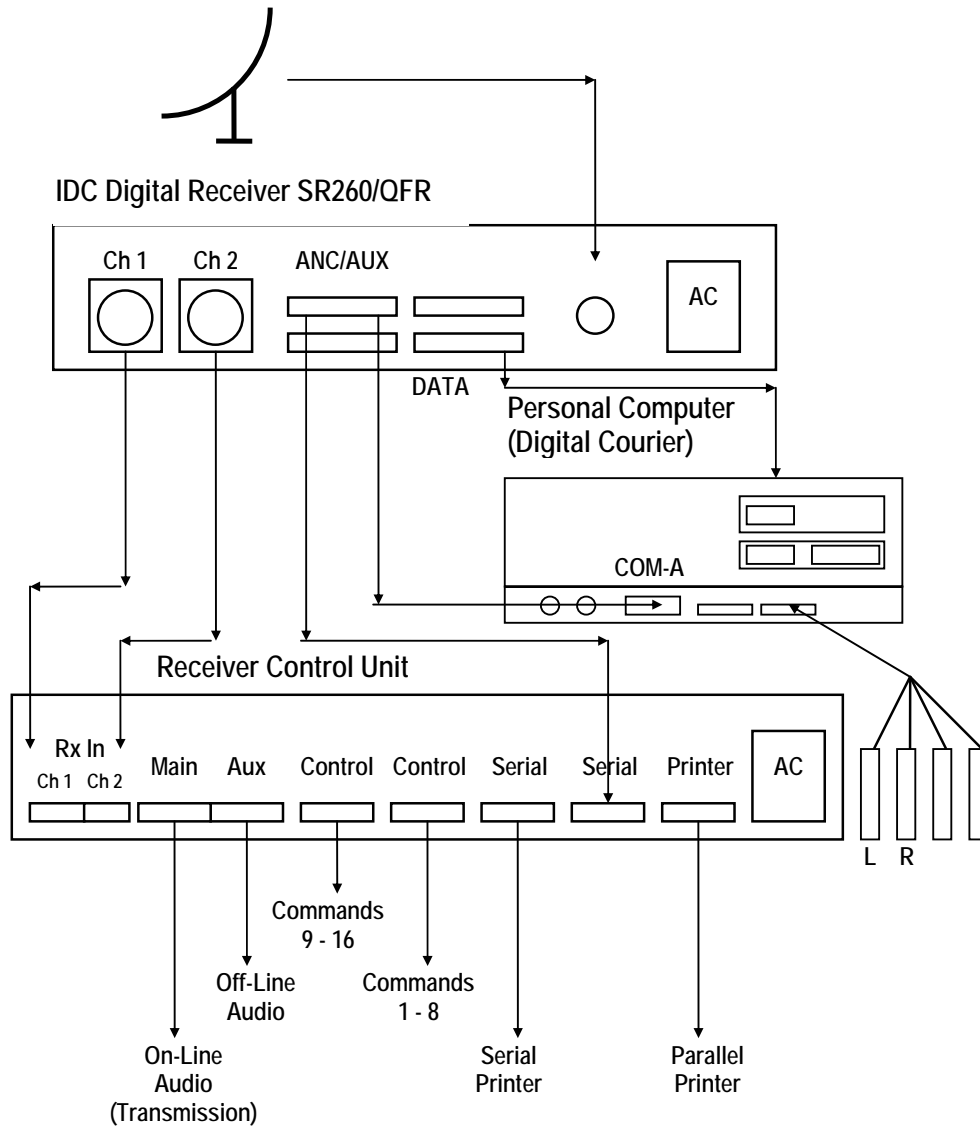
TECHNICAL OPERATIONS

Radio Syndication or inquiring about schedules, please be sure to mention which time zone you are talking in (if relevant).

Remember, we are here to help you! If you are having problems we will assist in every way we can. Report any problems immediately and provide as much information as possible.

TECHNICAL OPERATIONS

Receiver Configuration



Note pinouts and wiring diagram for the Digital Courier PC is in the Digital Courier System Manual.

TECHNICAL OPERATIONS

Troubleshooting Guide

- 1 Reset Equipment As a first step in trouble shooting power down your station's receiver and receiver control unit (RCU) for 5 seconds. Authorisation is not lost when the receiver is powered down. Dirty power or signal interference can sometimes cause the MPEG decoder in the receiver to lock-up (even if pulsing continues).
- 2 Loss of signal in the early morning Could be due to a spider in the feedhorn or the LNB, the morning dew collects on the fresh web and degrades the signal. Ensure the dish and feedhorn are clean.
- 3 Loss of audio/commands Being a digital system, once the bit error rate exceeds a preset threshold within the receiver, the receiver mutes. The lock light on the receiver will progressively go from GREEN to OFF to RED as signal degrades - this could be local interference or uplink rainfade (see 5).
- 4 Sun Transit Interference There are certain times of the year when, due to the rotation of the Earth around the Sun, the Sun appears behind the satellite. The Sun is an extremely high source of electromagnetic radiation, this in turn is received by the antenna and the receiver is overloaded with interference. The outage lasts only for a short time period, these periods can be predicted, affiliate stations are always notified during Sun transit season.
- 5 Rainfade Heavy rain can block the signal from the satellite. The fade can occur either at the uplink or the receiving site. Maximum power is always applied to the uplink in order to minimise the affect to the receiving sites. Rainfade can have more of an effect on poorly aligned/small dishes or in systems where the signal is otherwise attenuated.
- 6 Other Receivers Other satellite receivers that loop through the RF (eg Comstream) can affect IDC receivers further down the chain. If your Fairfax Radio Syndication receivers lose lock for no reason, bypass any other receivers to ensure the IDCs are being fed directly.

Fairfax Radio Syndication operates a monitoring and technical support service. If you are experiencing problems it means either 1) you have faulty equipment; 2) you are experiencing rainfade or sun transit interference; or 3) the whole network is experiencing the same problem due to uplink failure.



TECHNICAL OPERATIONS

Dish Alignment Checks

At regular intervals Fairfax Radio Syndication suggests the following checks be made on the satellite equipment installation.

- 1 Check there are no spider webs around the feed horn of the LNB or spiders living within the feed horn. Because the LNB has constant power applied, spiders tend to live there during colder periods. If you lose reception in the early morning it is indicative that the feed horn of the LNB could have a problem
- 2 Check for rust or loose fittings on the satellite antenna mount. Tighten any loose fittings being sure to check your alignment and performance afterwards.
- 3 If you feel your dish alignment needs correction please contact your local satellite installer who has the proper equipment to fix the problem.



TECHNICAL OPERATIONS

Procedure for Returning Equipment

Equipment Under Warranty

The IDC Receiver and Remote Control Unit are each covered by a 12 month manufacturers warranty. The warranty commences from the date of delivery. For faulty equipment covered by the warranty, notify Fairfax Radio Syndication on (02) 9930 9810.

Equipment Not Under Warranty

For equipment not covered by warranty, Fairfax Radio Syndication will arrange for the pick-up and repair of the faulty equipment and delivery of a replacement unit. Notify Fairfax Radio Syndication on (02) 9930 9810. When the repaired equipment is returned to the radio station, the station will then return to Fairfax Radio Syndication the replacement equipment. The cost of repair and freight charges will be to your company's account.

Freight

In all cases freight for equipment to and from Fairfax Radio Syndication is paid by the owner of the equipment. As we get a bulk rate we will organise pick up and delivery. For a pick up equipment should be packed and left at reception and addressed to Fairfax Radio Syndication, 176 Pacific Hwy Greenwich NSW 2065.

TECHNICAL OPERATIONS

Glossary

ANCILLARY DATA CHANNEL	Data channel provided in the IDC digital radio system for carriage of command and control data (presentation relay closures) for the Receiver Control Unit. This is carried along with the corresponding audio stream.
AUXILIARY DATA CHANNEL	Data channel provided on the IDC digital radio system for distribution of information data to users. Fairfax Radio Syndication uses this to distribute <i>NewsMaker</i> news text.
AUXILIARY OUTPUT	Audio output port on the RCU which supplies audio program material for recording by the affiliate station, but normally not for immediate broadcast
CHANNEL LIGHTS	A pair of LED indicators (CH1 & CH2) on the IDC receiver which, when illuminated GREEN, show that the receiver is authorised to receive audio
CHANNEL LEVEL INDICATORS	A pair of LED bar indicators on the IDC receiver which show the instantaneous level of audio being received
DATA LED	Indicator on the RCU which flashes momentarily when command or information data is being received
DIP SWITCHES	A set of switches located on the underside of the IDC receiver, for tuning the receiver to the Fairfax Radio Syndication Networks transmission frequencies
IDC	International Datacasting Corporation. The Canadian manufacturer of the Flexroute Satellite Digital Audio system used by Fairfax Radio Syndication Network
LNB	Low Noise Block Downconverter. A component of the satellite antenna.
MAIN OUTPUT	Audio output port on the RCU which supplies audio program material for transmission to air by the affiliate station
MPEG-Layer II	Method for compressing digital audio data to provide cost effective low data rate transmission whilst retaining high quality
PLL-LNB	Phase Locked Loop. An LNB designed for high performance with very accurate frequency control characteristics
RCU	Receiver Control Unit. Equipment for interfacing the IDC receiver to the user's station equipment for audio routing and system control
UPS	Uninterruptible Power Supply. Equipment for maintaining continuity of mains power when the mains supply fails