Technical Manual

August 2014

MACQUARIE MEDIA
SYNDICATION

TECHNICAL OPERATIONS

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Quick Reference

- Ku Band
- Optus D2
- Transponder 1
- Vertical polarisation
- Main carrier downlink frequency = 12293.7500 MHz
- Circuit ID = FFXD001
- Modulation = QPSK 2/3
- Standard = DVB-S2
- Symbol rate = 1548.9Ksym
- International Datacasting SFX3102F PRO AUDIO
- Norsat PLL LNB recommended (stability +/- 25 kHz or better)
- Intermediate Frequency = 993.75
- NCC PID = 4151
- DVB S2 Transport Stream = 1

Important Information

The system is sensitive to external interference and especially to severe variations within the mains supply. Continuity 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.

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

It is recommended that the receiver be powered from an uninterruptible power supply.

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.

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Quick Set Up Guide

The IDC Receiver is shipped containing: 1 x SFX3102 Pro Audio Receiver

1 x Australian/IEC Mains Power Cord

Step 1 **Test to ensure the satellite receiver is operational after shipment.**

1. Set the receiver on a work surface; do not connect it to the antenna.
2. Plug the AC power cord into the rear panel and into the AC outlet.
3. The STATUS LED should now be RED.
4. After 2 minutes the:
    - STATUS LED will change to GREEN
    - LOCK LED will illuminate RED
    - CONTROL LED will be OFF
    - AUDIO 1 will be GREEN
    - AUDIO 2 will be GREEN
5. Power down the Receiver.

If any of the above steps fail, contact Macquarie Media Syndication.

Step 2 **Rack mount the Receiver, connect the antenna feed and power up.**

1. After 2 minutes the:
    - STATUS LED will change to GREEN.
    - LOCK LED will be GREEN.
    - CONTROL LED will BLINK GREEN.
    - AUDIO 1 will be GREEN.
    - AUDIO 2 will be GREEN.
2. Audio 1 or 2 may or may not be blinking, this is normal.

If any of the LEDs are not GREEN refer to the Installation Guide on pages 7 to 9 of this Manual.

Step 3 **Attach the audio and closures' connectors.**

For wiring, refer to the Receiver Configuration on Page 15.

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Program and Data Delivery by Satellite

The IDC SFX Series Pro Audio Satellite Receiver system is capable of utilising various industry standard compression CODECs for Broadcast quality transmission over satellite. 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 Satellite System Offers

- Digital 20 kHz stereo delivery
- Circuit assigning, start & stopping recording for pre-fed material
- Data transmission for AAP news copy
- Improved efficiency and increased program flexibility
- Full "localism" on network: IDs sweeps, jingles etc.

Satellite Equipment

SFX3102 Pro Audio Receiver excluding GST and Freight	$4,825.00
Monthly Satellite Fee (authorisation charge) ex GST	$519.00

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IDC Receiver Installation Guide

Introduction

These notes describe the installation and operation of the receiving equipment, a digital audio satellite receiver from International Datacasting Corporation. The system uplinks audio in the DVB-S2 standard. The transponder is Number 1, on Optus Satellite 2, D-series. Transmission from this transponder covers Australia and New Zealand. It requires a Low Noise Block Downconverter, LNB, PLL type. The SFX Pro Audio satellite receiver delivers two stereo audio streams and corresponding contact closures for IDs, sweeps, jingles etc.

The Main Output (Channel/Audio 1) is usually configured to supply the correct audio for a live broadcast feed. However, the Auxiliary Output (Channel/Audio 2) may, on occasion, also be used. To provide maximum flexibility we recommend both Channels are wired through to all on-air and production studios and your automation system.

The internal configuring of these outputs is controlled from Macquarie Media Syndication, the particular mode being dependent on the program format, channel usage, stereo, mono, dual mono etc. The Receiver also provides 4 relay contact closure outputs to control station equipment for local insertion of material into program presentations. The system provides the "News Maker" wire service which is supplied to authorised recipients through the RS–232 Receive Pin 1 on channel 2 relay connector.

The receivers also have the ability to replay, forward and store content via the Ethernet ports on the receiver.

Antenna Requirements

We recommend a dish size between 2m and 2.7m (location dependent). IDC satellite 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. For reliable performance, LNB Local Oscillator stability must be better than +/- 25kHz, 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.

Your antenna system should be regularly checked 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, isolate the LNB power feed from one or the other receivers, using a splitter with DC-isolation.

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Unpacking, Contents and Set-up

The IDC Receiver is shipped containing: SFX3102 Pro Audio Receiver
Australian/IEC Mains Power Cord

Receiver Preparation and Authorisation

1. Plug the power cord into the unit and into the AC outlet. The STATUS LED is now green. If it is not, contact Macquarie Media Syndication.
2. After a minute, the LOCK LED will illuminate. If the receiver's lock light does not turn green, follow this procedure:
3. Using the keypad, press the up or down arrow until you get to Carrier A. Press the green check mark button twice.
4. If the receiver displays the message: *Password Error*, press the RED X and arrow down to Authorisation, then press the Green Check Key twice.
5. Using the keys, enter B341, then press the Green Check Key. The receiver will now display 4 asterisks. Press the Red X button.
6. Arrow down until reaching Carrier A, then press the Green Check button twice.
7. Use the up or down arrow buttons to change the value and use the left or right arrow buttons to move the cursor left or right. Change the frequency to 0993.750000. Press the green check mark button to accept the frequency.
8. Press the right arrow to enter the Rate menu. Enter the carrier symbol to 01548.900.
9. Press the right arrow to enter the Mod standard menu. Select Modulation to DVBS2.
10. Press the right arrow to enter the Parameters menu. Set the Parameters to Auto.
11. Press the right arrow to enter the next menu which will be either:
    a. NCC PID menu. Set to 4151; or
    b. Spec Inversion menu. Set to Off.
12. Press the right arrow to enter the TS ID menu. Enter the TS ID to 1.
13. Press the right arrow to enter the 22 KHz Tone menu. Enter the 22 KHz to Off.
14. Press the right arrow to enter the Polarisation menu. Specify Horizontal.
15. Press the right arrow to enter the preferred menu. Specify Preferred as Yes.

16. Press the right arrow, the receiver will prompt to copy the settings to Carrier B. Select Yes, then press green check button to accept this option.
17. To power the antenna's LNB with the receiver:
    a. Press the red “X” button to exit the Carrier Menu and press the down button until you get to the LNB menu.
    b. Press the green check mark button to enter the LNB Power Supply menu, use the up or down arrow buttons to enable the LNB power supply.
    c. Press the green check mark button to accept the change. If the signal is present at the coaxial cable connector on the rear panel, your receiver should lock to the DVB carrier, indicated by the green LOCK LED.
18. Connect the antenna feed to the receiver and power-up.
19. When the LOCK LED is steady on GREEN, contact Macquarie Media 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 FLASHING GREEN.

LED Display

Lock indicates receivers lock to incoming satellite DVB carrier on the L-Band input.

- **Off**: no power and no lock.
- **Solid Green**: unit is locked to the DVB carrier.
- **Solid Orange**: unit is locked but the signal has fallen to a level at which uncorrected packets may appear. If rain fade is the cause, the receiver will recover quickly without losing lock.

- **Solid Red**: the unit is not locked to the DVB carrier, this will be the case while it's booting, lock is not expected until the status light turns green.

Status indicates the power-up status of the receiver, including LNB DC power status to the L-Band connector. This should be green while the receiver is in operation. If the light is red, this indicates a fault in the machine and it should be returned for repair.

Control Indicates the authorization for the receiver to process control commands. Once the receiver is locked it should start flashing to indicate its receiving and decoding commands.

Audio 1 and 2 provides indication of the authorization and audio decoding activity on the audio outputs. When the receiver is locked to an audio stream these lights will flash green, this is not an indication of the audio level as the lights will flash even when the audio is silent. Audio levels can be viewed from the menu on the LCD keypad.

When the audio stored on the receiver is a different duration to the log, the audio 1 and 2 lights will flash orange and the receiver will remain silent until a new command is received.

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Receiver LCD Display Options

First, press the Red X Button twice. Then change the display using the Left/Right Keys.

Status 1	Stream 1 Channel	Channel number for audio decoded by Audio 1	
Status 2	Stream 2 Channel	Channel number for audio decoded by Audio 2	
Status 3	CH 1 Relays 1-4	State of the pulsing relays for Audio 1	
Status 4	CH 2 Relays 1-4	State of the pulsing relays for Audio 2	
Status 5	Metadata STR 1	Serial data being sent on Audio 1	
Status 6	Metadata STR 2	Serial data being sent on Audio 2	
Status 7	CH 1 CH 2	Audio level as a graph for each Audio Channel	If frozen, recycle receiver
Status 8	Audio Backup	Should display “Disabled”	
Status 9	C/N	Carrier to Noise	Normal: 12db – 20db
Status 10	View Uncorr Biterbi	Displays the % of uncorrected errors received	Normal: <10%
Status 11	Signal Level	Displays as a % the signal level	Normal: 20% – 80%
Status 12	Sat 0 MAC Address	Displays the MAC address of the receiver card	

Receiver Menu

1. Only items show in red allow editing

2. All other menu items are controlled by the head end

3. Before editing items shown in red you must:

Go to Authorisation

Enter the password B341

Audio output ports

Audio Channels. This is a DE-9P (male) connector used as a unidirectional (output) analogue audio data port. Pin outs are as follows:

PIN	Acronym	Reference
1	LEFT +	Audio X Left +
2	GND	Ground
3	AES +	Digital Audio Output X +
4	GND	Ground
5	RIGHT +	Audio X Right +
6	LEFT -	Audio X Left -
7	GND	Ground
8	AES -	Digital Audio Output X -
9	RIGHT -	Audio X Right -

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 receiving station. Users will need to provide external means for level adjustment, if required. Clipping level at the receiver output is +16dBu.

For maximum flexibility, Macquarie Media Syndication recommends you use stereo audio distribution amplifiers to run the 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 Macquarie Radio Syndication to arrange a tone test for alignment.

AES digital output Axia Live Wire outputs are also available for integration into digital environments.

Control Ports

Relay closures integrated into the receiver and associated with each audio stream provide an interface for remote control of user's equipment. The contacts are selectable between normally-open and normally-closed. 4 commands are available for each audio stream.

Each audio stream with its associated Commands is independent, allowing simultaneous, multiple use of single commands across the various streams. The relay closures for each audio stream are configured as follows.

Relay	Schedule Command	Schedule Event
1	1	Commercial Start
2	2	Weather Start
3	3	Sports Credit
4	4	Station ID
Other	Service	Name
RS232 RX	Text	News Maker

For stations taking live programs that include news, the news ID should be hard timed.

News Maker

The News Maker service is supplied to authorised users via the serial data facility. The relay connectors of the receiver also provide for reception of serial data.

Pin 9 Serial Printer Port
Pin 6 Ground

Both ports have a fixed configuration, as follows:

Speed 9600 baud
Bits 8
Parity N
Stop 1

News Maker should be wired to receive text from relay connector 2 on the IDC receiver.

Time Source

The receiver is pre-configured to send NTP packets from Ethernet Port 0 (ETH0).

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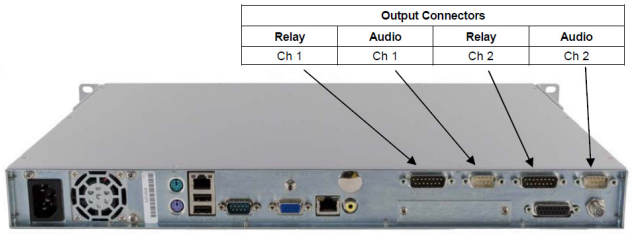
Receiver Configuration



Audio Channels DE-9P connector used as unidirectional analogue audio data port. Pin outs:

PIN	Acronym	Reference
1	LEFT +	Audio X Left +
2	GND	Ground
3	AES +	Digital Audio Output X +
4	GND	Ground
5	RIGHT +	Audio X Right +
6	LEFT -	Audio X Left -
7	GND	Ground
8	AES -	Digital Audio Output X -
9	RIGHT -	Audio X Right -

Relay Channels DA-15P (male) connector used as for 4 Form C relays. Pin outs:

PIN	Acronym	Reference
1	RX (not used)	RS–232 Receive
2	Relay 1 NO	NO Form C Lock 1
3	Relay 2 NO	NO Form C Lock 2
4	Relay 3 NO	NO Form C Lock 3
5	Relay 4 NO	NO Form C Lock 4
6	GND	Ground
7	Relay 1 NC	NC Form C Lock 1
8	Relay 2 NC	NC Form C Lock 2
9	TX from receiver to PC	RS-232 Transmit
10	Relay 1 Com	Form C Common 1
11	Relay 2 Com	Form C Common 2
12	Relay 3 Com	Form C Common 3
13	Relay 4 Com	Form C Common 4
14	Relay 3 NC	NC Form C Lock 3
15	Relay 4 NC	NC Form NC Form C Lock 4

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Manual Channel Change Procedure

To manually change the audio channel on the receiver, follow this procedure.

1. Press the Red X button once.
2. Using the keypad, press the up or down arrow until you get to “Authorisation”. Press the green check mark button twice.
3. Using the keys, enter B341, then press the Green Check Key once. The receiver will now display 4 asterisks. Press the Red X button once.
4. Arrow down until reaching Audio Player 1 or Audio Player 2 (depending on which channel you want to change), then press the Green Check button twice.
5. Scroll up or down to the required channel.
6. Press the Green Check Key once.
7. The receiver is now on the selected channel. If your receiver is not authorised for the selected channel it will revert to the original channel after a few seconds.

Troubleshooting Guide

Reset Equipment: As a first step power down your receiver for 30 seconds.

- **Loss of signal in the early morning**: Ensure the dish and feed horn are clean and free from any foreign objects.
- **Loss of audio**: Once the bit error rate exceeds a threshold, the receiver mutes. The lock will go from GREEN to ORANGE to RED as signal degrades - local interference or rain fade.
- **Loss of audio**: If the Ch 1 and/or Ch 2 LCD volume levels are frozen in either a full or mid range position this means the audio card has locked up. Recycle the receiver by pressing and holding for 5 seconds the small black reset button on the rear of the receiver.
- **Sun Transit Interference**: There are certain times when the Sun appears behind the satellite. The outage lasts only for a short time period, these periods can be predicted, and affiliate stations are always notified during Sun transit season.
- **Rain fade**: Heavy rain can block the signal. The fade can occur either at the uplink or the receiving site. Rain fade can have more of an effect on poorly aligned/small dishes or in systems where the signal is otherwise attenuated.

If you are experiencing problems it means either:

1. you have faulty equipment;
2. you are experiencing rain fade or sun transit interference; or
3. the whole network is experiencing the same problem due to uplink failure.

Please use the fault reporting system on the website. www.fxrs.com.au

Dish Alignment Checks

- 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.
- Check for rust or loose fittings on the satellite antenna mount. Tighten any loose fittings being sure to check your alignment and performance afterwards.

Procedure for Returning Equipment

Equipment Under Warranty

The IDC Receiver is covered by a 12-month manufacturer's warranty (unless extended warranty was purchased). The warranty commences from the date of delivery. For faulty equipment covered by the warranty, notify us on (02) 8570 0301.

Equipment Not Under Warranty

For equipment not covered by warranty, we will arrange for the pick-up and repair of the faulty equipment and delivery of a replacement unit. Notify us on (02) 8570 0301. Cost of repair and freight charges will be added to your company's account.