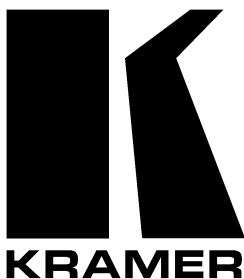


Kramer Electronics, Ltd.



USER MANUAL

Model:

FC-20

SDI / DV Transcoder

Contents

1	Introduction	1
2	Getting Started	1
3	Overview	1
4	Your FC-20 SDI / DV Transcoder	2
5	Connecting the FC-20 SDI / DV Transcoder	5
5.1	Powering the FC-20	5
5.2	MODE SELECT Dipswitch Settings	5
5.2.1	Setting the Audio Group	5
5.2.2	Setting DV Audio Channels	6
5.2.3	Setting the VITC or the DVITC Signals	6
6	Operating Your FC-20 SDI / DV Transcoder	7
6.1	Understanding the FC-20 LEDs	7
6.1.1	The POWER ON LED	7
6.1.2	The SDI IN LED	7
6.1.3	The DV DECODE LED	7
6.2	Understanding the DV DECODE / ENCODE MODES	7
6.2.1	Using the DV DECODE Mode	8
6.2.2	Using the DV ENCODE Mode	9
7	Technical Specifications	10

Figures

Figure 1: FC-20 SDI / DV Transcoder	3
Figure 2: FC-20 DV Decode Mode Configuration	8
Figure 3: FC-20 DV Encode Mode Configuration	9

Tables

Table 1: Front Panel FC-20 SDI / DV Transcoder Features	4
Table 2: Rear Panel FC-20 SDI / DV Transcoder Features	4
Table 3: FC-20 Audio Group Dipswitch Settings	5
Table 4: Technical Specifications of the FC-20 SDI / DV Transcoder	10

This addendum adds the following information to the user manual:



Caution – No operator-serviceable parts inside unit.

Warning – Use only the Kramer Electronics input power wall adapter that is provided with this unit¹.

Warning – Disconnect power and unplug unit from wall before installing or removing device or servicing unit.

¹ For example: model number AD2512C, part number 2535-000251

1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 350-plus different models now appear in 8 Groups¹, which are clearly defined by function.

Congratulations on purchasing your Kramer **FC-20 SDI / DV Transcoder**.

This product is ideal for the following typical applications:

- Live broadcast (remote control)
- Editing and duplication studios
- Interfacing between machines with differing formats
- Seamless conversion from DV to SDI or from SDI to DV

The package includes the following items:

- **FC-20 SDI / DV Transcoder**
- Power adapter (12V DC Input)
- This user manual²

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual

3 Overview

The Kramer **FC-20 SDI / DV Transcoder** is a portable DV to SDI bi-directional professional video converter with embedded audio. The **FC-20** is designed for use in the editing studio, for live broadcasting, and for any application requiring real-time transcoding between DV and SDI.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 Download up-to-date Kramer user manuals from our Web site at <http://www.kramerelectronics.com>

In addition, the **FC-20**:

- Auto-detects and supports PAL and NTSC
- Includes AES/EBU Embedded Audio Support (at 48kHz, synchronous to video)
- Can be powered from a computer using the same 6-pin FireWire cable that carries the DV stream in and out of the NLE (Non-Linear-Editor)
- Supports the DVITC¹ time code in the SDI data stream
- Features a separate VITC² input and output for analog decks via two BNC connectors
- Supports linear time code via the RS-422 port
- Is controllable via an NLE or manually via the DV ENCODE/DECODE front panel button³
- Controls tape decks and other video devices⁴ via the RS-422 port

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **FC-20** in a location free from moisture and away from excessive sunlight and dust

4 Your FC-20 SDI / DV Transcoder

Figure 1 illustrates the front and rear panels of the **FC-20**. Table 1 and Table 2 define the front and rear panels of the **FC-20**, respectively.

1 DVITC is Digital Vertical Interval Time Code

2 VITC is Vertical Interval Time Code

3 To be used only when there is no NLE

4 Only devices that conform to the Sony control protocol

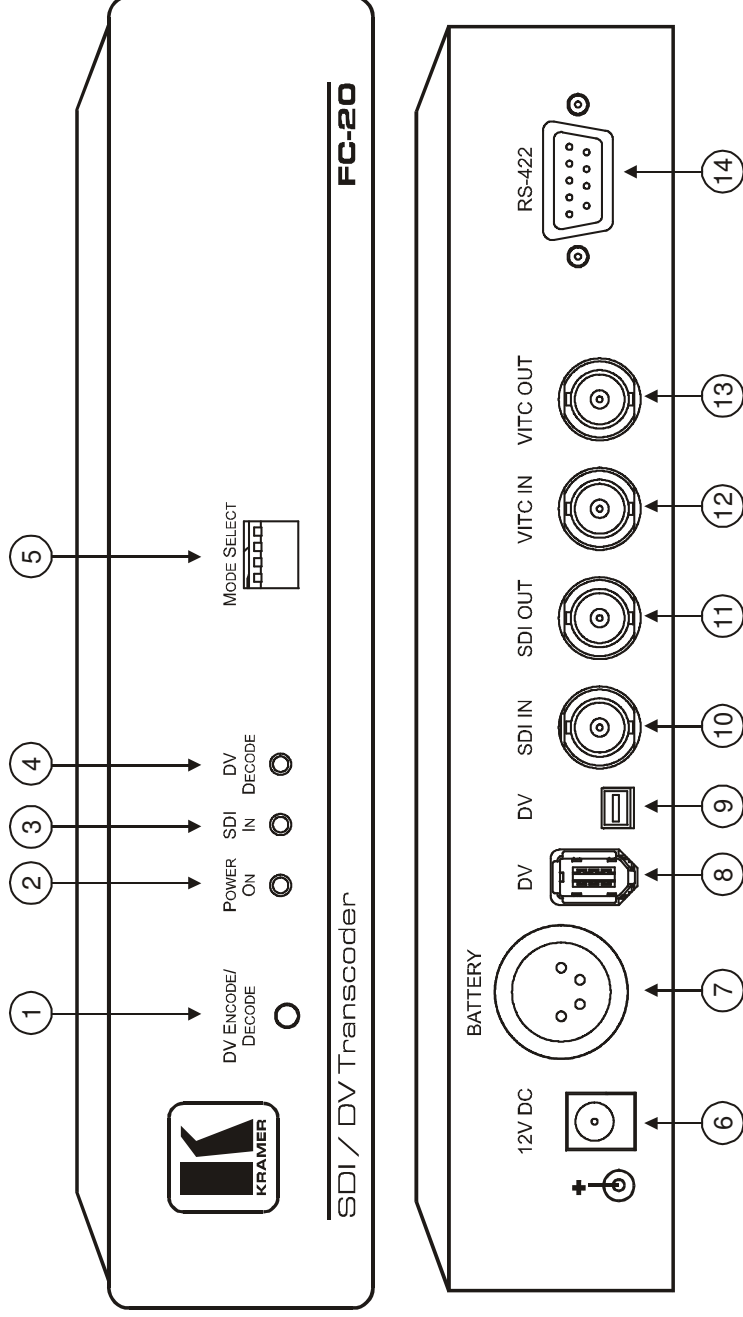


Figure 1: FC-20 SDI / DV Transcoder

Table 1: Front Panel FC-20 SDI / DV Transcoder Features

#	Feature	Function
1	<i>DV ENCODE</i> ¹ / <i>DECODE</i> ² Button	Press to toggle between the decode (default) and the encode modes ³
2	<i>POWER ON</i> LED	Illuminates when the machine is powered
3	<i>SDI IN</i> LED	Illuminates when SDI framing is received in the DV Encode mode and when DV framing is received in the DV Decode mode
4	<i>DV DECODE</i> LED	Illuminates when in the DV Decode mode
5	<i>MODE SELECT</i> Dipswitches	For machine setup (1 and 2 are for audio group selection; 3 is for channel pair selection; 4 is for VITC or DVITC timecode selection)

Table 2: Rear Panel FC-20 SDI / DV Transcoder Features

#	Feature	Function
6	<i>12V DC</i>	+12V DC connector for powering the unit
7	<i>BATTERY</i> XLR	Connects to a portable battery pack input
8	<i>DV</i> 6-pin port (FireWire)	Connects to a source or an acceptor for DV decoding or encoding and/or power via 1394a bus
9	<i>DV</i> 4-pin port (FireWire)	Connects to a source or an acceptor for DV decoding or encoding
10	<i>SDI IN</i> BNC Connector	Connects to the digital video BNC source, when selecting SDI as the input
11	<i>SDI OUT</i> BNC Connector	Connects to the digital video BNC output
12	<i>VITC IN</i> BNC Connector	Connects to the Vertical Interval Time Code IO
13	<i>VITC OUT</i> BNC Connector	
14	<i>RS-422</i> DB9C Port	Connects to control devices that conform to the Sony control protocol

1 In the DV Encode mode, SDI signals are converted to DV

2 In the DV Decode mode, DV signals are converted to SDI

3 Manual override

5 Connecting the FC-20 SDI / DV Transcoder

To connect the **FC-20**, do the following:

- Connect the SDI/DV inputs and outputs as required¹ (see section 6.2)
- Connect a Sony RS-422 controlled deck, if required
- Connect the power source (see section 5.1)
- Set the MODE SELECT dipswitches (see section 5.2)

5.1 Powering the FC-20

The **FC-20** features three power options for your convenience:

- An XLR 12V battery pack input
- A Universal DC Power Adapter
- Bus power (via 6-pin FireWire input port)

Power sources are wired in parallel, therefore power is available from any source at any time. For example, when more than one power source is connected to the **FC-20** unit, the source with the highest voltage takes over².

5.2 MODE SELECT Dipswitch Settings

Use the 4-pin dipswitches on the front panel to select the desired operation mode of the **FC-20**.

5.2.1 Setting the Audio Group

Dipswitches 1 and 2 are designated for audio group selection: A group of four audio signals are embedded in the serial digital video bitstream. You may select the audio group according to the settings in Table 3.

Table 3: FC-20 Audio Group Dipswitch Settings

Audio Group	Dipswitch	
	1	2
1	ON	ON
2	OFF	ON
3	ON	OFF
4	OFF	OFF

¹ Switch OFF the power on each device before connecting it to your FC-20

² If you have a laptop connected to your FC-20 and the XLR battery connected too, if the battery voltage dips, the laptop will take over and vice versa

5.2.2 Setting DV Audio Channels

Each group usually consists of four audio channels (or two stereo pairs). To select the desired pair:

- Set dipswitch # 3 to ON for: 1=Left/2=Right; or
- Set dipswitch # 3 to OFF for: 3=Left/4=Right

5.2.3 Setting the VITC or the DVITC Signals

The **FC-20** supports DVITC embedded timecode and separate analog VITC signals.

Dipswitch # 4 determines the source of the DVITC¹ or VITC timecode:

- Set dipswitch # 4 to ON for Analog VITC
- Set dipswitch # 4 to OFF for DVITC (SDI)

¹ Digital VITC embedded timecode

6 Operating Your FC-20 SDI / DV Transcoder

Operate your **FC-20** via the NLE or the DV ENCODE/DECODE button after setting the MODE SELECT dipswitches (see section 5.2).

6.1 Understanding the FC-20 LEDs

The **FC-20** consists of three LEDs described in the following sections.

6.1.1 The POWER ON LED

The POWER ON LED illuminates after the machine has been turned on and is ready for operation.

6.1.2 The SDI IN LED

The SDI IN LED illuminates when:

- SDI framing is received in the DV Encode mode
- DV framing is received in the DV Decode mode

6.1.3 The DV DECODE LED

The DV DECODE LED illuminates when the machine operates in the DV Decode mode.

6.2 Understanding the DV DECODE / ENCODE MODES

You can use the **FC-20** to convert DV to SDI signals or SDI to DV signals.

You can operate the **FC-20** in one of two modes:

- The DV DECODE Mode:
The **FC-20** unit converts DV signals to SDI signals (see section 6.2.1)
- The DV ENCODE Mode:
The **FC-20** unit converts SDI signals to DV signals (see section 6.2.2)

Note that in both modes where an NLE is present, switching occurs automatically, that is, via FCP commands, and so on.

If the camera connects directly to the deck, switching is manual (also, there is no deck control when using camera <-> deck connectivity).

6.2.1 Using the DV DECODE Mode

By default, the **FC-20** is set to the DV Decode mode.

When in the DV Encode mode, press the DV ENCODE/DECODE button to return to the DV Decode mode.

In the DV Decode mode, the DV source is transferred to the SDI OUT BNC. Data from a Non-Linear Editor can be easily transferred to a Betacam Recorder, as the example in Figure 2 illustrates:

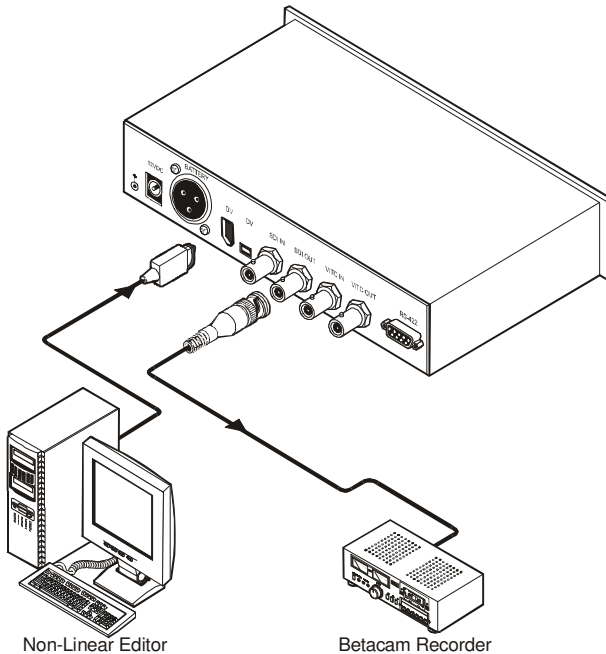


Figure 2: FC-20 DV Decode Mode Configuration

6.2.1.1 VITC in the DV Decode Mode

When in the DV Decode mode, the timecode is extracted from the DV stream and encoded on both the VITC OUT and the SDI OUT, regardless of dipswitch # 4 (see section 5.2.3).

The timecode is encoded onto an analog video signal that is input on VITC IN. The analog video signal on VITC IN is required since **FC-20** does not generate its own analog video signal.

To receive a time code signal at the VITC OUT connector, you must connect the VITC analog source to the VITC IN connector.

6.2.2 Using the DV ENCODE Mode

In the DV Encode¹ mode, an SDI signal is transcoded to the DV output. Data from an SDI source (for example a Betacam Player) is converted and transmits to an NLE or camera, as illustrated in Figure 3. When an SDI signal is inputted into the **FC-20**, the SDI output works as a loop for this signal.

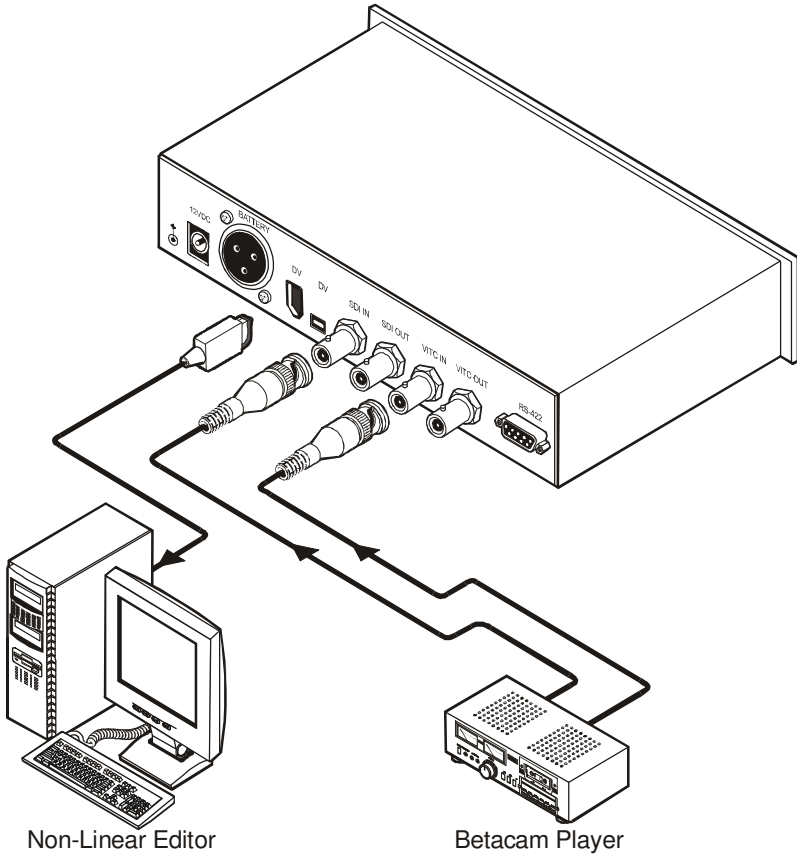


Figure 3: FC-20 DV Encode Mode Configuration

¹ Press the DV ENCODE/DECODE button to toggle to the DV Encode mode from the DV Decode (default) mode

6.2.2.1 VITC in the DV Encode Mode

When in the DV Encode mode, the timecode is encoded using the following methods:

- If dipswitch # 4 is set to VITC, then the analog VITC is extracted from the VITC IN signal and encoded onto the DV stream
- If dipswitch # 4 is set to DVITC, then the DVITC signal embedded in the SDI stream is extracted and encoded onto the DV stream
- If neither VITC nor DVITC are detected, the **FC-20** encodes a free running timecode onto the DV stream

7 Technical Specifications

Table 4 includes the technical specifications:

Table 4: Technical Specifications¹ of the FC-20 SDI / DV Transcoder

INPUTS:	1 SDI SMPTE-259M, ITU-R BT.601 on a BNC connector 1 VITC IN on a BNC connector
OUTPUTS:	1 SDI SMPTE-259M, ITU-R BT.601 on a BNC connector 1 VITC OUT on a BNC connector
TIME CODE:	DVITC (SDI BNCs); VITC via separate BNCs, and, linear TC via RS-422
DV PORTS:	One 6-pin FireWire port; one 4-pin FireWire port
CONTROL:	RS-422 on a DB-9F connector (Sony protocol) Dipswitches for audio group selection and DVITC/VITC selection
POWER SOURCE:	12VDC, 320mA on DC connector, XLR connector and 6-pin 1394A connector
DIMENSIONS	22cm x 18cm x 4.5cm (8.7" x 7" x 1.7") W, D, H (half 19", 1U)
WEIGHT:	1.2kg (2.6 lbs) approx.
ACCESSORIES:	Power Supply

¹ Specifications are subject to change without notice

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
 - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
 - ii) Product modification, or failure to follow instructions supplied with the product
 - iii) Repair or attempted repair by anyone not authorized by Kramer
 - iv) Any shipment of the product (claims must be presented to the carrier)
 - v) Removal or installation of the product
 - vi) Any other cause, which does not relate to a product defect
 - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

- EN-50081: "Electromagnetic compatibility (EMC);
generic emission standard.
Part 1: Residential, commercial and light industry"
- EN-50082: "Electromagnetic compatibility (EMC) generic immunity standard.
Part 1: Residential, commercial and light industry environment".
- CFR-47: FCC Rules and Regulations:
Part 15: "Radio frequency devices
Subpart B – Unintentional radiators"

CAUTION!

- ☒ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ☒ Use the supplied DC power supply to feed power to the machine.
- ☒ Please use recommended interconnection cables to connect the machine to other components.



For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found. We welcome your questions, comments and feedback.

