



***Fics-RT1***



**User's Manual**

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Specifications are subject to change without notice due to product improvements

## 1: Overview

The *Fics-RT1* is a handheld control terminal specifically designed for control of robotic systems and automated machines. The *Fics-RT1* integrates LCD display, keypad & operator safety devices into one compact & convenient unit. Almost all features of the *Fics-RT1* can be customer defined to produce a truly dedicated control terminal for any motion control applications.

## 2: Terminal Specifications

### 2-1: Standard Specifications

Item	Description
<b>Keypad</b>	(5×8+4) mechanical key switches
<b>Display</b>	4 row×20 character LCD display
<b>Emergency Stop Switch</b>	Mushroom style, push-lock type switch
<b>Communication Interface</b>	RS232C/RS422, Max 19,200 bps
<b>Power Supply</b>	DC5V: 220mA max DC12V (option): 210mA max DC24V (option): 60mA max
<b>Working Temperature</b>	0°C ~ 40°C
<b>Dimension · Weight</b>	200×87×25.5 (mm) 290 (g)
<b>Cable Length</b>	2m, 5m standard

### 2-2: Customer Defined Features:

Customers can specify the following when ordering customer's original terminal.

- Input power supply
- Communication protocol
- Keypad layout and definition
- Case color
- Cable (length, connector, and wiring)
- Emergency switch
- Others (contact our sales office)

### 3: Terminal RS232C Communication Link Details

#### 3-1: Connection Options

There are 3 ways of connecting *Fics-RT1* terminal.

Fig.1 shows connection of *Fics-RT1* terminal to *Fics*-series motion controllers. The signal from the emergency stop switch is transmitted as DTR signal. If the *Fics-RT1* cable is disconnected, activating emergency stop does not affect system operation.

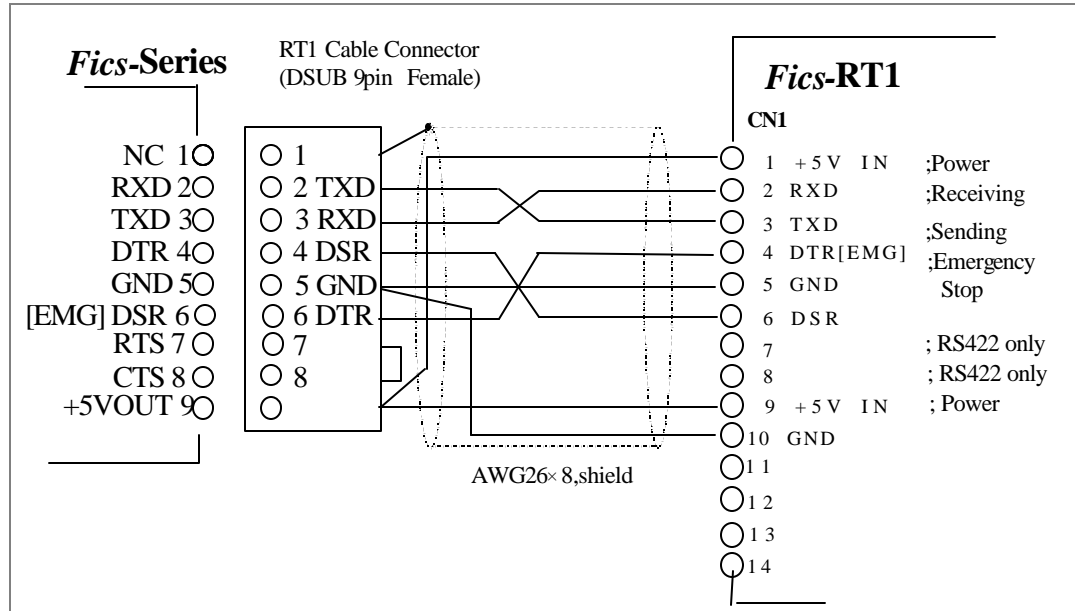


Fig.1: Standard Connector, RS232C, Emergency Stop as DTR Output

In Fig.2 and Fig.3, the signal from the emergency stop switch is transmitted as ON/OFF digital signal.

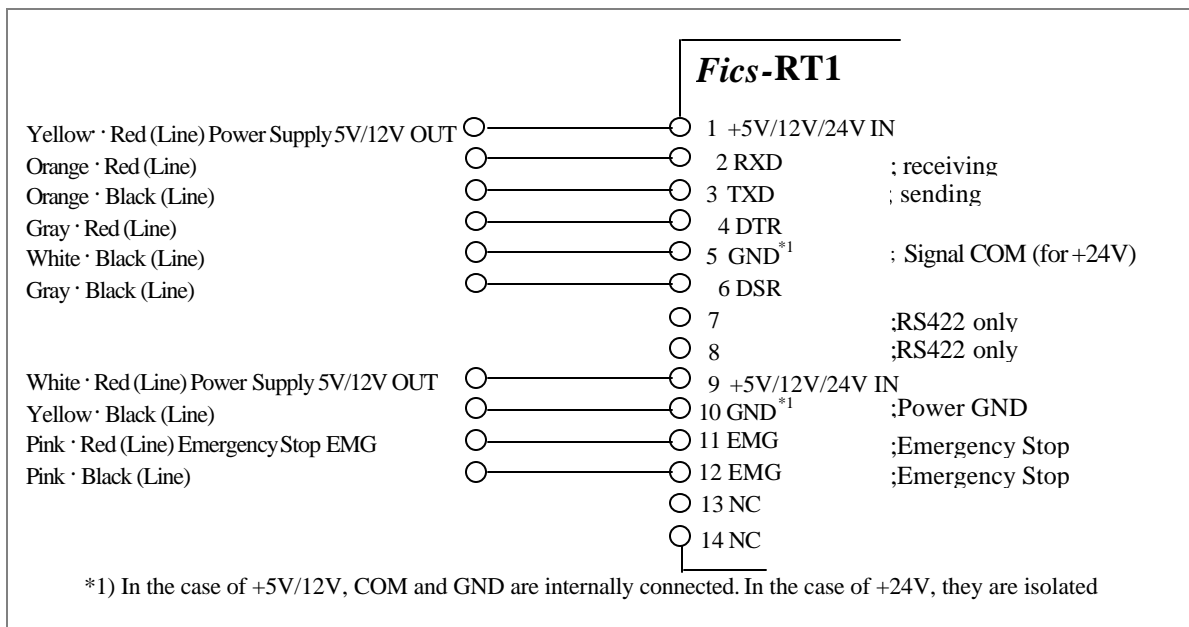


Fig.2: Free-end Cable, RS232C, Emergency Stop as A Direct Output

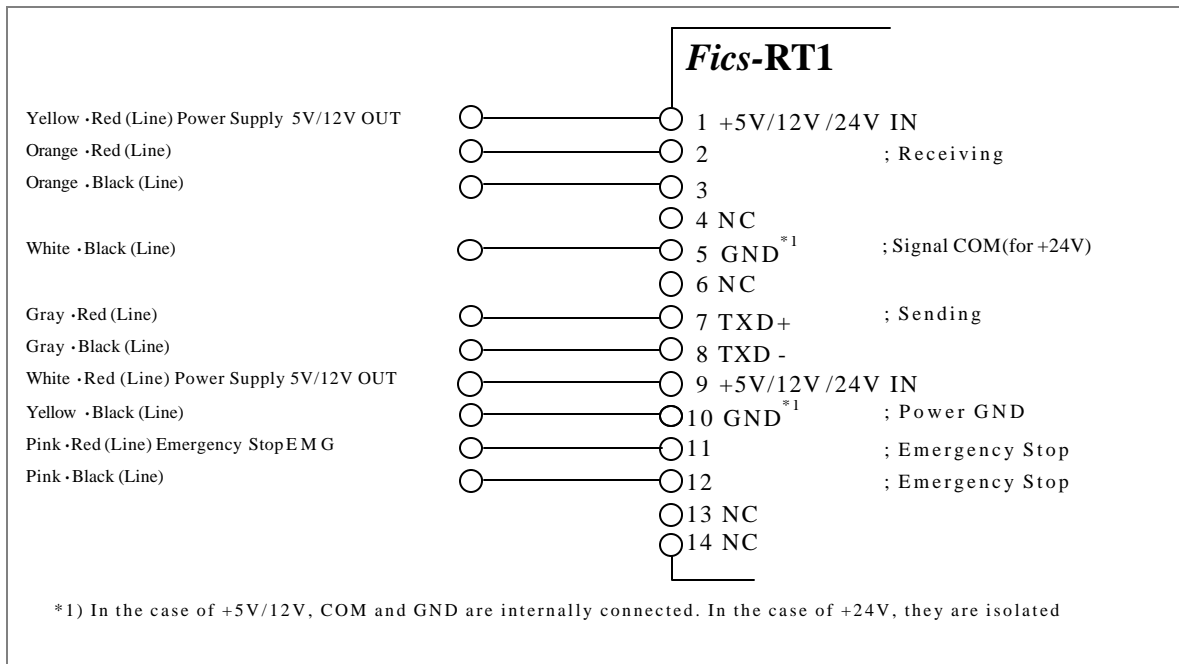


Fig.3: Free-end Cable, RS422, Emergency Stop Signal as An Open Collector Output

### 3-2: Emergency Stop Switch Operation Details

When emergency stop switch of **Fics-RT1** is directly connected to the controlled equipment, the emergency stop signal interacts directly with this equipment. In this case the CPU of **Fics-RT1** does not control or interact with emergency stop signal.

### 3-3: Communication Parameters

Communication parameters of **Fics-RT1** can be changed by the following operations.

Pressing<SHIFT>, <CLR> and <MODE> keys simultaneously leads to the following display menu.

```

== Fics-RT1 V2.22 ==
<F1> <F2> <F3> <CLR>
NEXT CHNG SAVE QUIT
BAUD RATE = 9600

```

Communication stops at this point.

By operating <F1>, or <F2>, or <F3>, or <CLR> keys, parameters can be changed. Pressing <F1> key switches the display menu to (1)~(5) as shown below.

No.	Parameter Name & Set Value	Available Choices
1	BAUD RATE = 9600	300/600/1200/2400/4800/ <b>9600</b> /19200
2	DATA BITS = 8	<b>8</b> /7
3	PARITY = NONE	<b>NONE</b> /EVEN/ODD
4	STOP BITS = 1	<b>1</b> /2
5	KEY BREAK = CODE	NONE/ZERO/ <b>CODE</b>

\* Bold face indicates default value.

Parameter values can be chosen by pressing <F2> key.

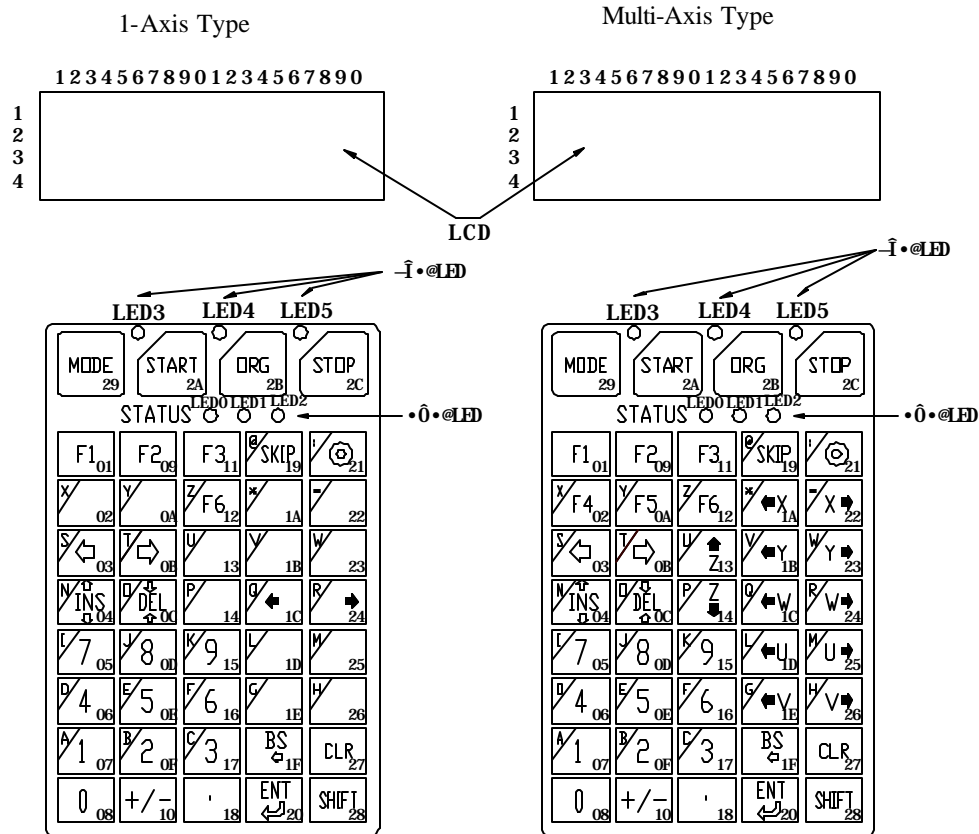
Press <F3> key to update the parameter settings. The display menu becomes

<F1>	<F2>	<F3>	<CLR>
YES			No
ARE YOU SURE?			

YES: update parameters  
No: do not update parameters  
Press <CLR> to terminate

## 4: Keys, LED Location, and Key Code

The Keys and LED location of *Fics-RT1* are shown below for 1-axis type and multi-axis type. The key code of *Fics-RT1* is shown at the bottom right of each key. LCD can display 4 by 20 ASCII characters.



The hexadecimal values shown in bold face at the bottom right corner of each key represents the code to be sent out when the key is pressed. For example, if <F1> is pressed, *Fics-RT1* will send out "01" (hexadecimal). When <F1> is released, *Fics-RT1* sends out "80 + 01" (hexadecimal) by default (KEY BREAK is set as "CODE").

## 5: Terminal Display

**Fics-RT1** displays, on its LCD, the received ASCII character at the current cursor position. Every time it receives a character, the cursor moves from left to right. When the cursor reaches the furthest right-hand point, the cursor moves to the left-hand side of next row. When the cursor reaches the right-hand side of the last row, it moves to the left-hand side of the first row. For the corresponding characters and their ASCII code, refer to the Appendix.

Characters between 00h~1Fh, 80h~9Fh, except the following code, are treated as error code. When error code XX is sent to **Fics-RT1**, error 'XX' will be displayed on LCD.

- 00h(RT1): Connection Hand-Shake Code (**Fics-RT1** sends 00h out)
- 08h(BS): Back Space Code
- 0Ah(LF): Line Feed Code (cursor moves to next row. When it reaches the last row, cursor will not move)
- 0Dh(CR): Cartridge Return Code (cursor moves to the beginning in the same row)
- 1Bh(ESC): Escape Code

The escape sequence, represented by the Escape Code (1Bh) + one character, has the following special meaning.

ESC A	Cursor UP	Cursor moves 1 row up
ESC B	Cursor Down	Cursor moves 1 row down
ESC C	Cursor Right	Cursor moves 1 character right
ESC D	Cursor Left	Cursor moves 1 character left
ESC E	Clear Display & Home Cursor	Clear display and cursor moves to the home position
ESC F	Cursor On	
ESC G	Cursor Off	
ESC H	Cursor Home	
ESC J	Erase To End Of Screen	Erase from cursor position to the end of screen
ESC K	Erase To End Of Line	Erase from cursor position to the end of line
ESC L	Long Bell	
ESC M	Erase Line	
ESC N	Key Brake Code	When key is pressed generate the key code. When key is released generate `key code`+'80h`
ESC O	Key Brake None	When key is pressed generate the key code. When key is released do nothing
ESC P	Key Brake Zero	When key is pressed generate the key code. When key is released generate `00h` code
ESC R	Enable Cursor Blink	
ESC S	Disable Cursor Blink	
ESC T	Short Tone	Active buzzer with short tone
ESC U	Enable Key Click	Beep when key is clicked
ESC V	Disable Key Click	Disable beep when key is clicked
ESC Y Pr Pc	Position Cursor At Pr, Pc	Cursor moves to row Pr and column Pc Row1, Col1=(20h+row position), (20h+column position)
ESC Z	Report Device ID	Send <b>Fics-RT1</b> identification code(' RT1 V2.22' )
ESC [0a	LED0 ON	
ESC [1a	LED1 ON	
ESC [2a	LED2 ON	
ESC [3a	LED3 ON	
ESC [4a	LED4 ON	
ESC [5a	LED5 ON	
ESC [0b	LED0 OFF	
ESC [1b	LED1 OFF	
ESC [2b	LED2 OFF	
ESC [3b	LED3 OFF	
ESC [4b	LED4 OFF	
ESC [5b	LED5 OFF	

×Connection Test: send 00h to **Fics-RT1**, if 00h is received, then **Fics-RT1** is connected.



## Appendix: LCD Character Code of *Fics-RT1*

The correspondence between characters and their ASCII code is given below.

upper 4bits / lower 4bits	0000	0001	0010	0011	0100	0101	0110	0111
xxxx0000	RT1			0	@	P	`	p
xxxx0001			!	1	A	Q	a	q
xxxx0010			“	2	B	R	b	r
xxxx0011			#	3	C	S	c	s
xxxx0100			\$	4	D	T	d	t
xxxx0101			%	5	E	U	e	u
xxxx0110			&	6	F	V	f	v
xxxx0111			‘	7	G	W	g	w
xxxx1000	BS		(	8	H	X	h	x
xxxx1001			)	9	I	Y	i	y
xxxx1010	LF		*	:	J	Z	j	z
xxxx1011		ESC	+	;	K	[	k	{
xxxx1100			,	<	L	¥	l	
xxxx1101	CR		-	=	M	]	m	}
xxxx1110			.	>	N	^	n	
xxxx1111			/	?	O	_	o	

## Terminal Model Designation

**Fics-RT1** has different models depending on the input power supply, cable length, case color, handling of emergency stop signal, etc.

Use the following model designation to select terminal.

OEM products are classified by terminal number.

### [Model Designation]

