1 2	3	4	I	5		6			NKK Confide
PRODUCT SPECIFICATIONS 1/19				ASSIGNMENT	Г		-		
1.PRODUCT OUTLINE				AJJIUNIILIN	-				
1-1 OUTLINE : NKK controller a	hip performs position detection	on which the touch screen	9	eff AINLU EL1 EL1					
	using NKK 4 & 5 wires analog								
-	transmit the position coordinate			1000 m 20 20 20 20 10 10 10 10 10 10 10 10 10 10 10 10 10					
			CLKsel 37 0UTC1 38 NC 39	C1 23 00- 23 00- 22 0V	+ - bus				
1-2 FEATURES:				21 UV 20 NC	dd				
(1) Power source voltage		-	X2 - 44		TY1/LD1 TY0/LD0				
	RS232C & 4 wire touc	h screen)	X1 45 REGC 46 Vss 47		TX1/RU1 TX0/RU0				
(2) A/D converter resolu			Vddcmm 48	₩ 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
(3) Interface : RS232C	& USB 2.0 Full speed								
(4) Others									
*Package: LQFP 48 pi	IS		100 AV	S/INT 00					
* High accuracy * Efficiency improvement	nt of host CPU operation.			L L					
	bounce, malfunction preventior	n hv noise)							
*Duplicate coordinate	-		/ PIN	DESCRIPTIO	N				
	ne functions by commands from	i host computer.	4.1 111						
-	only available for RS232)	1		1					
	-		PIN NO	NAME	IN/OUT OUT	Power indicator	FUNCTION		
2. OUTER DIMENSION	N		2	VING 4W/5W SEL		Select touch screi	en type. 4/5 wire	(See page 5, c	olumn 6)
			3	ROM SEL	IN .	Select with/ withou	it EEPROM (See	page 5, column 6	5)
. 9 ±0.	2		4	U/R SEL		Select interface, L			5)
7 ±0			6	OUTPDWN CLK	OUT OUT	FET controll pin f Connect to EEPR(WΠ	
			7	DO	IN	Connect to EEPRO			
			8	DI	OUT	Connect to EEPRO			
			9 10	CS SW0	OUT IN	Connect to EEPR((Note 1),(Note 2)	JM chip select		
	0.75		11	NC	IN	Connect to Vss b	y 10kΩ		`
	0.75		12	INT_S/INT_USB	V IN	232C : Interrupt in	put USB:Vcc det		
			13		IN OUT	Serial data trapa			
			14	OUTX0/RU0	OUT	Serial data trans FET controll pin-			
			16	OUTX1/RU1	OUT		1 for 4 wire-X, 5		
<u>1PIN INDEX</u>	0.22 ±0.05		17	OUTYO/LDO	OUT		0 for 4 wire-Y, 5		
1PIN0.75	- 11 -		<u>18</u> 19	OUTY1/LD1 NC	OUT	FET controll pin-	1 for 4 wire-Y, 5	WIFE-LU	
	انە تە		20	NC					
	+0.05				-				
	0.14.5 +0.055								
		F	Security Class C ISSUANCE			· · · · · · · · · · · · · · · · · · ·			
			May.20,2019				APPROVED H. Kurashim	a <i>'17</i> DIM	ALE 5 : 1 ENSIONS IN mm
<u>0.1 ±</u> c			- ONLY YOU CAN USE THIS DRAWING - DO NOT COPY	├			CHECKED E M. Tamura	SY: Apr. 27 Unless off	erwise specified tole ns range (Toler
				MODEL ET OC				3Y: Apr.18 Up to 6	±
		l	NKK SWITCHES CO., LTD.	110.		(FTCSU54	DRAWN BY:		
					KK SWI	CHES CO., LTD	. S. Kurihara	<i>'17</i> Over 50	t
1 2	3			I		0	7 1	No. 190545	FT-CSU548_1(海外用

PRODUCT SPECIFICATIONS 2/19

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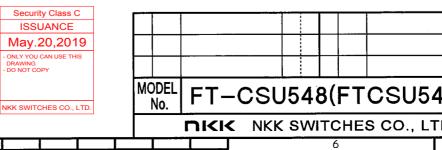
1				
	PIN NO.	NAME	IN/OUT	FUNCTION
	21	UVdd	IN	Connected to Vss via a capacitor $0.33 \mu F$
	22	UVbus	IN .	RS232C:Connect to Vss by 10kQ
	23	D0-	IN/OUT	USB upstream I/O
	24	D0+	IN/OUT	USB upstream I/O
	25	ID SELO	IN	Connect to Vss by 10kΩ
	26	ID SEL1	IN	Connect to Vss by 10kΩ
в	27	INY0/IN5	IN	A/D converter input (4 wire-Y, 5wire-TPin)
	28	NC	IN	Connect to Vss by 10kΩ
	29	INX0/INLU	IN	A/D converter input (4 wire-X,5wire-LU)
	30	NC	IN	Connect to Vss by 10kΩ
	31	AVrefM	IN	Reference voltage input pin for A/D converter (-).
	32	AVrefP	IN	Reference voltage input pin for A/D converter (+).
	33	BEEP	OUT	Beep output
	34	RD	OUT	FET controll pin for 5 wire-RD
	35	LU	OUT	FET controll pin for 5 wire-LU
	36	OUTCO	OUT	External output-0
С	37	CLKsel	IN	Clock selection (See page 5, column 6)
-	38	OUTC1	OUT	External output-1
	39	NC	OUT	
	40	RSTX	<u>IN</u>	Reset input for active "L"
	41	NC	IN	Connect to Vss by 10kΩ
	42	NC	IN	Connect to Vss by 10kΩ
	43	INT_PDW	IN	Pen-down interrupt input
	44	X2	IN	<u>Clock input</u>
	45	X1	IN IN	Clock output
	46	REGC	IN	Connected to Vss via a capacitor
D	47	Vss		GND potential of all terminals
	48	Vdd		Power source to 3.3VDC/5VDC

Note 1: The pin connected to pull-up resistor inside the controller chip. Note 2: Open

5. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL		NAME	RATINGS	UNIT
Power source voltage	Vcc	Vdd		-0.5~6.5	V
UVdd pin input voltage	Viuvdd	UVdd		-0.3~Vcc +0.3 (Note3)	V
nput voltage	VII	NC(No.11,28,3 ID SELO,ID S DO,CIKsel,X1	30,41,42),INX0/INLU,INY0/IN5, SEL1,INT_S/I <u>NT_US</u> B_V,UI,SW0, ,X2,INT_PDW,RSTX	-0.3~Vcc +0.3 (Note3)	V
	Vi2	D0+, D0- 4/5W SE	, UVbus EL,ROM SEL,U/R SEL,	-0.3~+6.5	V
Output voltage	Vo1	RD,LU,OUT OUTX0/RU OUTPDWN CS,DI,CLK0	TYO/LDO,OUTY1/LD1, JO,OUTX1/RU1, JOUTC1,UO,VING, DUTC0,BEEP	-0.3~Vcc +0.3 (Note3)	V
	V02	D0+, D0-		-0.3~6.5	V
REGC UVdd pin input voltage	Viregc	REGC		-0.3~+2.8 and -0.3~Vcc+0.3 (Note4)	V
Operating temperature	Ta			-20~85	Ċ
Storage temperature	Tstg			-40~125	°C
"H" input voltage	loh1	1 pin	LU,RD,OUTY0/LD0,OUTY1/LD1 OUTX0/RU0、OUTX1/RU1 OUTPDWN,OUTC1,U0,CS,DI,CLK BEEP,OUTC0	-40	mA
		Total -170mA	LU,RD,OUTC1,BEEP,OUTC0	-70	mA
· · ·			OUTYO/LD0,OUTY1/LD1 OUTX0/RU0,OUTX1/RU1,U0 OUTPDWN,CS,DI,CLK	-100	mA
'L" input voltage	lo l 1	1 pin	LU,RD,OUTYO/LDO、OUTY1/LD1 OUTXO/RUO、OUTX1/RU1 OUTPDWN,OUTC1,UO,CS,DI,CLK VING,BEEP,OUTC0	40	mA
		Total -170mA	LU,RD,OUTC1,BEEP,OUTC0	70	mA
			OUTYO/LD0,OUTY1/LD1 OUTXO/RU0,OUTX1/RU1,U0 OUTPDWN,VING,CS,DI,CLK	100	mA
Analog Input voltage	Vai	AVrefP,AVre	efm,inxo/inlu,inyo/in5	-0.3~Vcc+0.3 (Note3) and-0.3~AVrefP+0.3	V

Note 3: 6.5 V or less Note 4: REGC Connect the REGC pin to Vss via a capacitor (0.47 to 1 μ F). This regulates the absolute maximum rating of the REGC pin.



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	— H. Kurashima	' 17		NSIONS	N mm	
	CHECKED BY:	Apr.27	Unless other	vise specif	ied tolerances	
	M. Tamura	' '17	Dimensions	sTange	Tolerances	
		Apr.18	Up to 6	\bigtriangleup	±0.3	F
48)	H. Kadowaki	17	Over 6	p to 30	±0.5	
		4pr:14	0ver 30 u	ip to 50	±8,8	
D.	S. Kurihara	· 17	Øver 50		±1.2	
	7 No. 190545		1E-FT	-CSU548_	2(海外形名)	-
		•				

PRODUCT SPECIFICA		3/10														
PRUDULT SPELIFICA	TIUNS _															
5-2.Recommended operating c	onditions	Vcc=3.3/5.0V,±5.0% Vss=0V、C Communicate by USB:Ta=0~7	ommunicate by RS2320	:Ta=-20~8	35℃. ¥5	252325 /	wiroc	analog ta	nuch scre							
	1	1			LIMITS	(JZJZC, 4			1						MITS	
ITEM	SYMBOL		TEST CONDITION	Min.	Typ.	Max.	UNIT	ITEM	SYMBO)L NA	λМЕ	TEST CONDI			Typ. Max	<.
Power source voltage	Vcc	Vdd	Vcc=5.0V	4.75	5.0	5.25	v	"H" outpu	ut Ioh1	LU,RD,OUTYO/LDO						~
			Vcc=3.3V *	3.135	3.3	3.465	V	current		OUTXO/RUO、OUTX OUTPDWN,OUTC1,U					-3.0	
Operating temperature		-	RS232C	-20	-	85	°C	(Note 1)		BEEP,OUTCO 1 pir					(Note	_
	-	-	USB	0	-	70	:0 V			LU,RD,OUTC1,BEEP (Duty≤70%) Tot		Vcc=5.0V ±	5%		-30.0	.0
Analog reference voltage	Vref	AVrefM AVrefP		-	Vcc	-	V				ul ,				-10.0	
Power source voltage	Vss	Vss		-	0	-	V			(Note 4)		Vcc=3.3V ±			- 10.0	<u> </u>
"H" input voltage	Vih1	INT_S/INT_USB V,UI,SW0,D0 CIKsel		0.8Vcc		Vcc	. V			OUTY0/LD0,OUTY1 OUTX0/RU0,OUTX1 OUTPDWN,CS,DI,CLI	/RU1,U0	Vcc=5.0V ±	5%		-30.0	.0
	Vih2	INXO/INLU,INYO/INS,ID SELO,ID SEL1		0.7Vcc		Vcc	V			(Duty≤70%) Tot (Note 4)	al	Vcc=3.3V ±	5%		-19.0	0
	Vih3	4W/5W SEL,ROM SEL,U/R SEL		0.7Vcc		6.0	V			All pin total (Duty≤70%) (Note 4)					-60.0	.0
	Vih4	X1,X2,INT_PDW,RSTX		0.8Vcc		Усс	V	"L" outp current		LU,RD,OUTYO/LDO OUTXO/RU0、OUTX OUTPDWN,OUTC1,L	x1/RU1				8.5 (Note	
"L" input voltage	Vil1	INT_S/INT_USB V,UI,SW0,D0 CIKsel		0		0.2Vcc	V	(Note 2	,	BEEP,OUTCO 1 p	in					
	Vil2	INXO/INLU,INYO/INS,ID SELO,ID SEL1	L	0		0.3Vcc	V			VING 1 pin					15.0 (Note	
		4W/5W SEL,ROM SEL,U/R SEL		0		0.3Vcc	V			LU,RD,OUTC1,BEEF (Duty≤70%)	2,0UTCO Total	Vcc=5.0V ±	:5%		40.0	0
	Vil 4	X1,X2,INT_PDW,RSTX		0		0.2Vcc	V			(Nofe 4)		Vcc=3.3V ±	:5%		15.0))
										OUTYO/LDO、OUTY OUTXO/RUO、OUTX OUTPDWN,UO,VING,	(1/RU1	Vcc=5.0V ±	5%		40.0	0
										(Duty≤70%) (Note 4)	Total	Vcc=3.3V ±	5%		35.0	0
										All pin total (Duty≤70%) (Note 4)					80.0	0
								Clock frequen	n⊂y f	X1			15	5.960	16 16.04	40
								Note 1.	It is a c if it flow	urrent value tho vs from the Vcc	at guarantees terminal to th	the operation e output termin	of the dev Ial.	vice ever	Π	
							·	Note 2.	lt is a c if curre	current value the nt flows to the	at guarantees output terminal	the operation	of the de	vice eve	ΥΩ	
									1	ase do not exce						
						Secu	rity Class C		but, the Also, c	current flowing urrent exceeding	in one termino the absolute	Il does not cha maximum rating	ange depe j can not	ending or be pase	ו duty sed.	
						ISS	SUANCE						PROVED BY: Kurashima	May.9 '17		_
						- ONLY YO	.20,201						ECKED BY:	1	QIMENSIONS Unless otherwise spe	
						- DO NOT C						М.	Tamura	17	Dimensions range	
								M		-CSU548	(FTCSU	5 48) ^{СН}	ECKED BY: Kadowaki	Apr.18 '17	Up to 6 Over 6 up to 3	2
						NKK SWI	TCHES CO., L	.TD.				DR	AWN BY:	Apr. 14	Over 30 up to 5	
									יוח		TCHES CO., I	LTD. S.	Kurihara	17	Øver 50	

PRODUCT SPECIFICATIONS 4/19

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5-3. DC standard

(Vcc=3.3/5.0V,±5.0% Vss=0V, Communicate by RS232C:Ta=-20~85°C, Communicate by USB:Ta=0~70°C, unless otherwise noted)

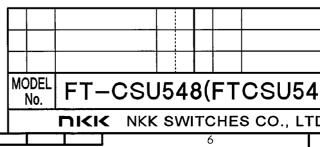
							LIMITS		
		ITEM	SYMBOL	NAME	TEST CONDITIONS	Min.	Typ.	Max.	UNIT
_	"H" Vol	output tage	Voh1	LU,RD,OUTY0/LD0、OUTY1/LD1 OUTX0/RU0、OUTX1/RU1 OUTPDWN,OUTC1,U0,CS,DI,CLK	Vcc=5.0V±5% loh1=-3.0mA	Vcc-0.7			V
				BEEP,OUTCO	loh1=-2.0mA	Vcc-0.6			V
В					loh1=-1.5mA	Vcc-0.5			V
	"∟" ∨ol	output tage	Vol1	LU,RD,OUTY0/LD0、OUTY1/LD1 OUTX0/RU0、OUTX1/RU1 OUTPDWN,OUTC1,U0,CS,DI,CLK BEEP,OUTC0	Vcc=5.0V ±5% lol1=8.5mA			0.7	V
					lol1=3.0mA			0.6	V
					lol1=1.5mA			0.4	V
С					lol=0.6mA			0.4	V
			Vol2	VING	Vcc=5.0V ± 5 % lol1=15.0mA			2.0	V
					Vcc=5.0V±5% Iol1=5.0mA			0.4	V
					lol1=3.0mA			0.4	V
					lol1=2.0mA			0.4	V

ITEM	SYMBOL	NAME	TEST	CONDITIONS		LIMITS	-	UNIT	
	STRIDUL		IES	CONDITIONS	Min.	Тур.	Max.	UNIT	
"H" input leakage current	llih1	AVrefM,AVrefP,NC(No.11,28,30) INXO/INLU,INYO/IN5,ID SEL0,ID SEL1 INT_S/INT_USB V,UI 4W/5W SEL,ROM SEL,U/R_ <u>SEL</u> SW0,,D0,CLKsel,INT_PDW,RSTX	Vi=Vcc				1	μA	
	llih2	X1,X2,NC(41,42)	Vi=Vcc	External clock			1	μA	
				Resonator connection			10	μA	
"L" input leakage current	Ilil1	AVrefM,AVrefP,(No.11,28,30) INXO/INLU,INYO/IN5,ID SEL0,ID SEL1 INT_S/INT_USB V,UI 4W/5W SEL,ROM SEL,U/R <u>SEL</u> SW0,,D0,CLKsel,INT_PDW,RSTX	Vi=Vss				-1	μA	
	llil2	X1,X2,NC(41,42)	Vi=Vss	External clock			-1	μA	
				Resonator connection			. –10	μA	
RAM hold voltage (Note 1)	Vdddr	V đ d			1.44		5.25	V	
Power source	l d d 1	Vdd	Calibra	tion data mode		6.5		m A	
current (Note 2) (Note 3)			S	top mode		241		μA	

(Note 1) Data is not retained when reset is applied

(Note 2) It is the total current flowing to V_{ID}. Includes input leakage current when it is fixed to input terminal V_{ss}. but, the current flowing during A / D converter, LVD circuit, I / O port, internal pull-up / pull-down resistor, data flash rewrite is not included.

(Note 3) USB internal power supply



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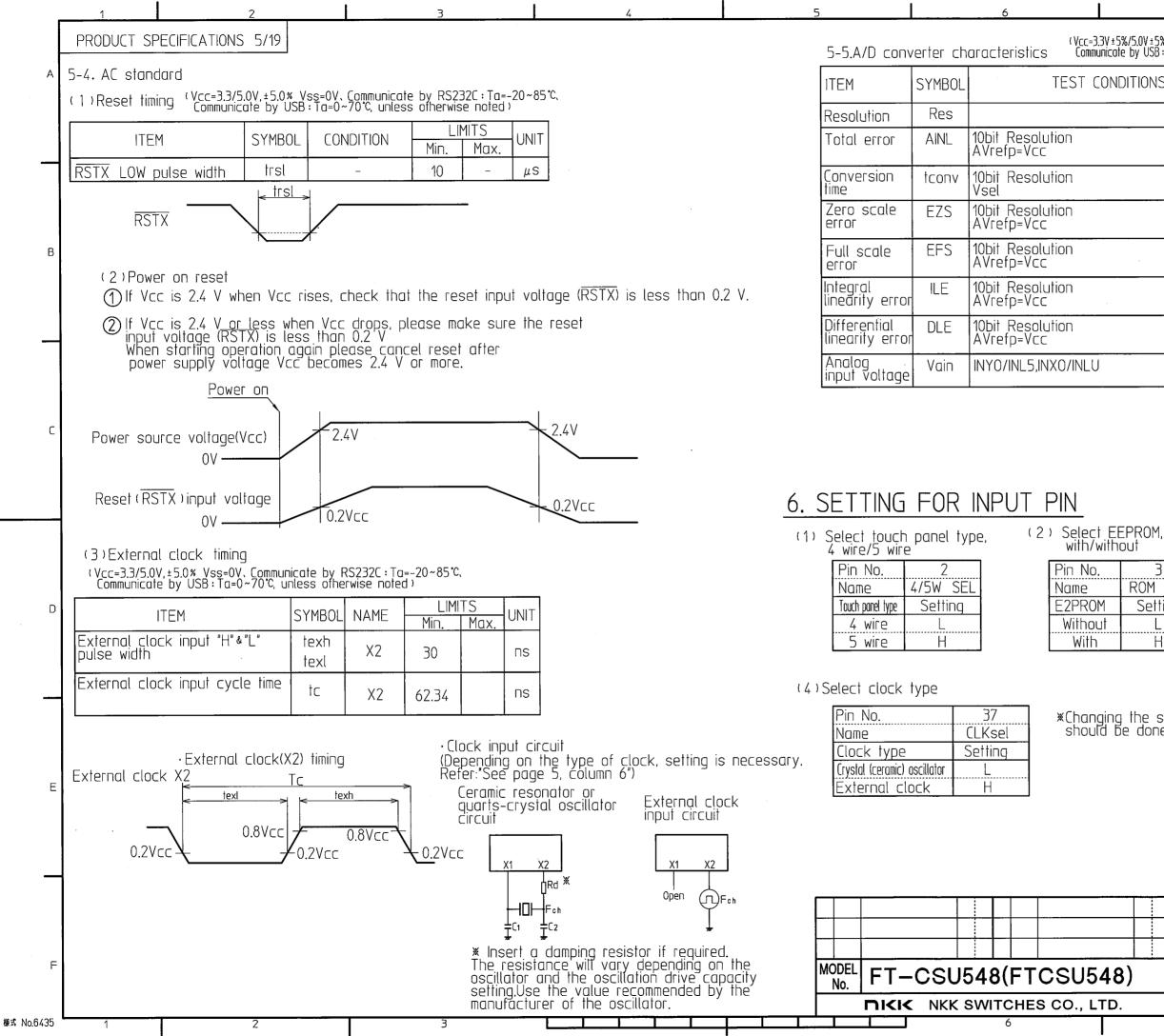
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NKK SWITCHES CO., LTD.

					1
	APPROVED BY:	May.9	SCALE	:	
	H. Kurashima	·17	QIMENSIONS	IN mp	
	CHECKED BY:	Apr.27	Unless otherwise spec	ified tolerances	
	M. Tamura	17	Dimensions lange	Tolerances	
	CHECKED BY:	Apr.18	Up to 6	±0.3	F
18)	H. Kadowaki	17	Over 6 up to 30) ±0.5	
_	DRAWN BY:	Apr.14	Over 30 up to 50) ±0,8	
D.	S. Kurihara	· · ·	Øver 50	±1.2	
	7 No. 1905	45	1E-FT-CSU548	(_4(海外形名)	
		-			



NDITIONS		LIMITS		UNIT	A
	Min.	Тур.	Max.	UNIT	
	_	-	10	bit	
	-	1.2	± 3.5	LSB	
	2.125	_	39	μS	
	4	-	±0.25	%FSR	
	-	_	±0.25	%FSR	В
	-	-	± 2.5	LSB	
	_	_	± 1.5	LSB	
	0	_	Vcc	V	

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ROM SEL Settina Н

(3) Select interface type, RS232C/USB

Pin No.	1.
Name	U/R SEL
Interface	Setting
RS232C	L.
USB	Н

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May.20,2019

*Changing the setting of each terminal should be done when the power is turned off.

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				NKK SWITCHES CO.,	LTD.	
		APPROVED BY:	May.9	SCALE	: /	
	_	H. Kurashima	·17	QIMENSIONS I	N mm	
		CHECKED BY:	Apr.27	Unless otherwise specifi	ied folerances	
		M. Tamura	17	Dimensions lange	Tolerances	
		CHECKED BY:	Apr.18	Up to 6	±0,3	F
8)		H. Kadowaki	' '17	Over 6 up to 30	±0,5	
		DRAWN BY:	Apr.14	Over 30 up to 50	±8,8	
D.		S. Kurihara	17	Øver 50	±1.2	
		7 No. 19054	5	1E-FT-CSU548_	5(毎外形名)	

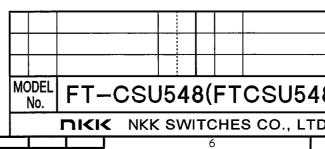
PRODUCT SPECIFICATIONS 6/19

7. FUNCTION EXPLANATION

Note: Valid interface (R: Only RS232C is available, U: Only USB is available, R/U: Both RS232 & USB are available)

Note: Valid interface (R: Only RS232C is available, U: Only USB is available

		-						
	FUNCTION	CONTENTS	NOTE	EXPLANATION	FUNCTION	CONTENTS	NOTE	
	Interface	Serial and USB communication	R/U	The asynchronous serial and USB	Calibration	Calibration	R/U	Calibrate the touch panel c
	Sampling rate	Set to the	R/U	Calibration data mode Max. 130 p/s				
		optional value		Source data mode Max. 190 p/s	Low power	Stop mode	R	Stop mode: stops
в					function			The way of wake up Pe
В			-			Way of switching	R	The command whic
						to each mode		has the following
	Coordinates data format		R/U	See page 11 "Format of the coordinates data"				Direct : After receiv
	Coordinates mode	Source data mode	R/U	A/D converted data is sent to the host CPU.				power mode
		Calibration data mode	R/U	Calibrated data is sent to the host CPU.				Auto:After the la
	Data output	Point mode	R/U	Outputs the coordinates value of the first pen down only.				for a preset
	mode	Stream mode	R/U	Outputs a coordinates value continuously while the pen remains down.				low power m
	Duplicate	Stop to send	R/U	Compares the coordinates value transferred in the previous		Transition times	R	Transition from nor
	coordinate	Duplicate coordinates		operation with the current coordinate data and if the				Transition from sto
_	processing			coordinate values are the same, the controller does not send the current coordinate data. (Only valid in stream mode)				
C	function		<u> </u>		Status	Controller setting	R/U	Chip sends the sett
	Time-out	Sets the time-out time	R	If the required data was not received within the preset	function	state confirmation	100	Cull Selius ine seli
	function			time-out time, the controller sends error code "F3h" to the host CPU.	Interface	Tests the	R	Tests whether the
		l			test function	interface		and the host CPU
					Pen up code	1 byte	R	Send 1 byte pen u
					Ifunction	l		Send 4 bytes pen
3					Lock function	4 bytes	R/U R/U	If a lock command
						Starts and clears	R/U	If a lock command coordinate data currently
						the lock function		The lock state is cl
_					Reset	Software reset	R	Reset by the comm
D						Hardware reset	R/U	Reset by the RST
						Power on reset	R/U	Reset when turning
						Watchdog reset	R/U	When the software of cont
					A/D converter	Resolution	R/U	10bit
					Host CPU data	Output the data from host CPU	R/U	Output the level fr
					output function			has sent from hos
					Power source indicator	Power source	R/U	Blink LED on and (
					Веер	Веер	R/U	Output "H" level signa
_								



様式 No.6435

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le,	R/U:	Both	RS232	&	USB	are	available)
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EXPLANATION	
nel coordinates to the LCD coordinates.	I
ops oscillation.	. I I
:Pen down, reset, stop cancellation	
hich switches to each low	power mode
ng two ways.	
ceiving a command, it shifts	to the low
ode immediately.	
last coordinate input, if th	
set time, the controller swit	tches to the
mode.	
normal mode to low power	
stop mode to normal mode	: about 50ms+ 5µs
	l lc
setting state of the controller	to the bost (PU)
sening state of the controller	10 me nosi ei o.
ne communication between th	ne chip
IPU, normally using by the a	optional data.
n up code when pen up.	
en up code when pen up.	
en up coue when pen up.	
na is issued, after transmit	TING THE
nd is issued, after transmit ently being transmitted, the controlle s cleared by sending a lock	
s cleared by seriaing a lock	
	D
<u>STX pin.</u>	
ning on the power supply	
controller is out of controll, the reset	function works automatically
	7 1 1 1 1 1
l from chips pin no. 16 & 17 nost CPU.	, which the data 🛛 🛄 🛶
nd off while the controller (
ignal while settled time when d	etected pen down.
	· · · · · · · · · · · · · · · · · · ·
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	NKK SWITCHES CO., LTD.
APPROVED BY: May.	9 SCALE :
H. Kurashima 1, 11	7 QIMENSIONS IN mp
CHECKED BY: Apr.2	7 Unless otherwise specified tolerances
M. Tamura 11	
CHECKED BY: Apr. 1	8 Up to 6 ±0.3 F
🗙) H. Kadowaki 🔤 '1,	
DRAWN BY: Apr. 1	4 Over 30 up to 50 ±8.8
D. S. Kurihara '1,	7 Øver 50 ±1.2
7 No. 190545	1E-FT-CSU548_6(海外形名)

PRODUCT SPECIFICATIONS 7/19

8. RS232C COMMUNICATE SPECIFICATION AND COMMANDS

8-1. RS232C Communicate specification

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ITEM	CONTENTS
Boud rate (unchangeable)	9600(bps)
Communication protocol (unchangeable)	Data length: 8 bit Parity bit: None Stop bit: 1 bit

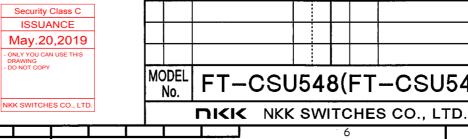
8–2. Commands for using RS232C communication

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Function	Command	Command value	Number of the bytes	Description				
Sampling rate	Setting of sampling rate	91h	3	Default setting: 80(p/s)				
	Sends an optional	value 10 to maximu	m (p/s) according to th	ne following format.				
	bit7 bit6 bit	5 bit4 bit3 bit	2 bit1 Bit0					
	1 0 0			z7:The binary number of sampling				
	0 0 0			rate (z). (z7 is the high-order bit)				
		. 2	each mode as follows	:				
		1 mode – 130 (p						
		190 (p						
		ot to settle more th ate data may beco	an the maximum sampli nes abnormal.	ing rate.				
Coordinates	Source data mode		1	Default setting: Calibration				
mode	Calibration data mode	81h	1] data mode				
		1.01						
Data output _.	Point mode	A0h	. 1	Default setting: Stream mode				
mode	Stream mode	A1h	1	J				
				Default acting . Eachla				
Duplicate coordinate	Enable	84h	1	Default setting:Enable				
processing function				-				
	Disenable	85h	1					
		1	I	2				
Time-out function	Time-out value (z)	88h	3	Default setting: 100				
	According to the following format, it sets time-out value (z).							
	bit7 bit6 bit	5 bit4 bit3 bil	2 bit1 Bit0					
	1 0 0			• The binary number of time-out				
	0 0 z9 z8 z7 z6 z5 z4							
	It calculates time-out time by the following formula and it sets a time-out value.							
		ne (ms)=4 × time	-out value					
	The minimum of time-out value z≥1							

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5	6	7 8 NKK Confidential
unction Command		
bit7 bit6 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 </td <td>o the following format, contropliation bit5 bit4 bit3 bit2 bit1 Bit3 0 0 0 0 1 Bit3 bit2 bit1 Bit3 0 0 0 0 1 Bit3 bit2 bit1 Bit3 0 0 x3 x2 x1 x x x9 x8 x7 x6 x5 x 0 0 y3 y2 y1 y y9 y8 y7 y6 y5 y 0 0 X3 X2 X1 X X X9 X8 X7 X6 X5 X 0 0 X3 X2 Y1 Y Y9 Y8 Y7 Y6 Y5 Y 0 0 Ax3 Ax2 Ax1 A Ax9 Ax8 Ax7 Ax6 Ax5 A <t< td=""><td> Ider calculate and sets a calibration ratio. command The 1st LCD reference point X0~x9: The binary number of the horizontal axis coordinates x of the 1st reference point y0~y9: The binary number of the vertical axis coordinates y of the 1st reference point (x9, y9 are the high-order bit). The 2nd LCD reference point X0~X9: The binary number of the vertical axis coordinates Y of the 2st reference point Y0~Y9: The binary number of the vertical axis coordinates Y of the 2st reference point (x9, y9 are the high-order bit). The A/D value of the 1st reference point (x9, y9 are the high-order bit). 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 		APPROVED BY: May.9 SCALE H. Kurashima 17 DIMENSIONS IN mm



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		APPROVED BY:	May.9	SCALE	:	
		H. Kurashima	17	QIMENSIONS	N mp/	
		CHECKED BY:	Apr.27	Unless otherwise specifi	ied folerances	
		M. Tamura	17	Dimensions lange	Tolerances	
		CHECKED BY:	Apr.18	Up to 6	±0.3	F
48	3)	H. Kadowaki	17	Over 6 up to 30	±0.5	
	-	DRAWN BY:	Apr.14	Over 30 up to 50	±0,8	
).		S. Kurihara		Øver 50	±1.2	
		7 _{No. 190545}		1E-FT-CSU548	7(海外形名)	

Low Part data with the wind the investories Addit data (state) Lot (state) Difference (state) Difference (state) State) Constraints (state) State) State) <t< th=""><th>Function</th><th>Command</th><th>Command value</th><th>Number of the bytes</th><th>Description</th><th>Function</th><th>Command</th><th></th><th>Number of the bytes</th><th>Description</th></t<>	Function	Command	Command value	Number of the bytes	Description	Function	Command		Number of the bytes	Description
Part of Luctor Upper display Span func- tor The same display is a span func- state of the function (the function) The same display is a span func- tor The same display is a span func- inglay is a span func- ingla	Low	Auto stop		2	The codes and the wait time	Status	Status	C3h	2	
Card there Addit there Lab. Extension Direction Direction <thdirection< th=""> <thdirection< th=""></thdirection<></thdirection<>	power	Direct stop		1		1 1 1	Mode	Code	Return	value
State State <th< td=""><td>function</td><td>Auto clear</td><td></td><td>1</td><td></td><td>Indirentiti</td><td>Coordinates</td><td>00h</td><td>1</td><td></td></th<>	function	Auto clear		1		Indirentiti	Coordinates	00h	1	
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where concelling an adva step note, for even the "Step near "armond (2D), second send an "Mult Usua" command (ED). Take an informating the step near the step into the		The way of wake	up from the auto s	stop mode: Pen down, re	set, "Stop clear" command reception					wer order sampling rate value (z3~:
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Bite::::::::::::::::::::::::::::::::::::		command (B4h).	Take an interval tim	ne (more than 50msec) be	etween first and second commands.		function		Oxh:x is the lower order tir	ne-out value (z3-z0).
When a setup a contradic except the stop close contradic tech approximated Dentify and the stop close contradic specessing function description tech approximate processing function description and the stop close contradic processing function description and the stop close		When returning f	rom the stop mode, t	pe sure to use stop clear	command (E2h).					
Do not send the 'Auto stop' not 'Direct stop' commonds while pendown the fouch ponel. 00: not send the 'Auto stop' not 'Direct stop' commond's while pendown the fouch ponel. 00: not send the 'Auto stop' not 'Direct stop' commond's while pendown the fouch ponel. Interface Interface CA 2 Affectione Interface CA 2 Affectione Interface 00: 10: 00: 00: 00: 00: 00: 00: 00: 00:		(When sending a a	command except the	e stop clear command (E	E2h), operation doesn't guaranteed.)		Duplicato	065		
Interface Interface C4h 2 Interface Are the reception of 2 bytes data which 1 byte of interface dagrass command IC#) and 1 byte of gene data. A bytes 00000 this wate interface 00000 this wate interface Are the reception of 2 bytes data which 1 byte of interface dagrass command IC#) and 1 byte of thick care 00000 this wate interface 00000 this wate interface Code 4 bytes E3h 1 1 Code 5 byte E3h 1 Lock care Enh byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction East byte of constraints 1 Defourt setting: Lock clear Unction 1 0 0 1 0 Unction 1 0 1 0 0 1 Unctrion		Do not send th	e "Auto stop" nor	"Direct stop" commands	while pendown the touch panel.		coordinate	0011		
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Part of Code (code (code) 4 bytes (bytes) E3n 1 1 byte (code) Ext Ext 0h 0h<	function	optional data from the	host CPU, the controlle	er sends back 1 byte of recei	ved optional data to the host CPU.			0011		
Clinitian Set the type of ponup code. 4 bytes of type Lock Lock condition E0h 1 Lock Lock clear E0h 1 Lock Lock clear E1h 1 Lock Software reset	Pen un	4 bytes	E3h	1			Pen up code	0Ah		
Lock	lcode '	1 byte	E4h	1			functión		-	
Lack Lack clear Eth 1 Reset Coh 1 Reset Coh 1 Software reset 20:0.4 wire 21:0.0 without E2MR04 Host CPU Host CPU dub A2h 2 bit7 function bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0 0 0 0 0 1 0 0 charter erset Bit7 function bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0 0 0 0 0 1 0 0 charter erset Bit7 bit6 bit5 bit4 bit3 bit2 bit1 bit0 0 0 0 0 0 1 0 charter erset 0 Bit7 bit6 bit7 bit4 bit3 bit2 bit3 bit4 bit3 Clear E2PR0M Clear E2PR0M Clear E2PR0M Clear the all stored E2PR0M date F1 When receiving an undefined by the command composed command. In endefined by the sectification), the controller sends 'F3h' to the host CPU. <td>function</td> <td>Set the bytes o</td> <td>f pen up code. 4</td> <td>bytes or 1 byte</td> <td></td> <td></td> <td>Host CPU data</td> <td>0Bh</td> <td>0xh:x=Data from host CPU</td> <td></td>	function	Set the bytes o	f pen up code. 4	bytes or 1 byte			Host CPU data	0Bh	0xh:x=Data from host CPU	
LachClion Lock clear E-lh 1 Resel COn 1 Resel COn 1 SoftWare resel	Lock	Lock condition		1	Default setting : Lock clear				0xh: x=0.07170	
Reset COh 1 Software reset	function	Lock clear	E1h	1			4/5 wire touch panel	l	70: 0-4 wire 71: 0-Withou	E2PROM
Software reset Host (PU data output A2h 2 Default setting : Pn no. 36 & 38 are 't' level data output End (PU bit / L' level and set 'f' for the 'H' level. bit / Di to be bit 20' or 'z't to output 'L' level and set 'f' for the 'H' level. bit / Di to be bit 20' or 'z't to output 'L' level and set 'f' for the 'H' level. 8-3. Error codes for RS232C communication Bit / Pin No. 20 36 21 38 The controller chip starts from default setting after rebool, no matter with or without EZPROM. 8-3. Error codes for RS232C communication Clear E2PROM Clear E2PROM C5h 1 Clear the all stored E2PROM data Beep line setting Beep line (adva to be controller sends 'F2h' to the host CPU. F3 : When receiving a new command while receiving a plural composed command. the controller sends 'F2h' to the host CPU. Set the beep line from 100 to 300 msec by 50 msec step. Pin no. 79 output the 'H' level while the settled line when pen down the louch purel. Set the beep line from 100 to 300 msec by 50 msec step. Pin no. 79 output the 'H' level while the settled line when pen down the louch purel. Set the low of 00h 01h 05h 02h 03h 04h 05h 'H' level ine lineed 0 100 150 200 250 300 Generative gene C INSUMACE May 20.2019				· · · · · ·					1-5 WIFE 1- WITH	ZPRUM
Host CPU data output function Hest CPU data A2h 2 Dedut setting: Pin no. 36 & 38 ore 1' level Set '0' to the bit' 20' or 'z1' to output 'L' level and set '1' for the 'H' level. bit 20' or 'z1' to output 'L' level and set '1' for the 'H' level. bit 0 A	Reset		C0h	1						
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Function bit 7 bit 6 bit 5 bit 4 bit 3 bit 2 bit 1 bit 0 1 0 1 0 <td>HOST LPU</td> <td></td> <td></td> <td>o outout "L" level or</td> <td>Uetault setting : Pin no. 36 & 38 are 1. level and set "1" for the "H" level</td> <td></td> <td></td> <td></td> <td></td> <td></td>	HOST LPU			o outout "L" level or	Uetault setting : Pin no. 36 & 38 are 1. level and set "1" for the "H" level					
I 0 1 0	function									
Image: Setting										
Bit Pin No. The controller chip starts from default setting after reboot, no 8-3. Error codes for RS232L communication Clear E2PROM Clear E2PROM C5h 1 Clear the all stored E2PROM data Gata Clear E2PROM C5h 1 Clear the all stored E2PROM data Beep time 86h 2 Default setting: 0 msec F3: When neceiving data which isn't defined by the command composed by plural bytes, the controller sends "F3h" to the host CPU. F3: When receiving data which isn't defined by the command after the time-out time the controller sends "F3h" to the host CPU. F4: When receiving a new command while receiving a plural composed commands. Codes 00h 01h 02h 03h 04h 05h Way202019 Secury dass C May202019 May202019										
Image: Set the beep time 86h 2 Default setting: 0 msec Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level while the settled time when per down the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" level when the fouch panel. Set the beep time from 100 to 300 msec by 50 msec step. Prin no. 19 output the "H" le				v 2, 2v		8-3. Erro	r codes for	RS232C com	Imunication	
Image: Set the beep time setting 86h 2 Default setting: 0 msec 90 msec step. Set the beep time from 100 to 300 msec by 50 msec step. Default setting: 0 msec F3: When the controller sends "F3h" to the host CPU. Set the beep time from 100 to 300 msec by 50 msec step. Pin no. 19 output the "H" level while the settled time when pen down the fouch panel. F4: When receiving a new command while receiving a plural composed commands. Codes 00h 01h 02h 03h 04h 05h Security diss C Weight the fine finese(0 100 150 200 250 300 Security diss C Security diss C IssuAnce May 20, 2019 May 20, 2019		Bit P	in No. The contr	roller chip starts from a	default setting after reboot, no			defined command	(the command undefin	ad by this apacification)
Image: Clear E2PROM C5h 1 Clear the all stored E2PROM data Glear E2PROM C5h 1 Clear the all stored E2PROM data Beep time 86h 2 Default setting: 0 msec setting Set the beep time from 100 to 300 msec by 50 msec step. Default setting: 0 msec Pin no. 19 output the "H" level while the settled time when pen down the touch panel. F4 : When receiving a new command while receiving a plural composed commands. Codes 00h 01h 02h 03h 04h 05h YT Were time time dimed to 200 250 300 Security diss C ISSUANCE Nazyo 20019 May 20, 20019 Were time time of the touch panel.		zO	36 matter wit	th or without E2PROM.	-					eu by mis specification,
Clear E2PROM Clear E2PROM C5h 1 Clear the all stored E2PROM data data		z1	38							nosed by plural bytes
Cector L21 Non received in the car shored L21 Non data Beep time setting Beep time setting Set the beep time from 100 to 300 msec by 50 msec step. Pin no. 19 output the "H" level while the settled time when pen down the touch panel. Codes 00h 01h 02h 03h 04h 05h 1'H" level time (msec) Other time (msec) Security glass C Security glass C May.20,2019 Concers 00h 01h 02h 03h 04h 05h 1'H" level time (msec) Other time (msec) <tr< td=""><td></td><td></td><td></td><td>1 1</td><td></td><td></td><td></td><td></td><td></td><td>posed by planal bytes,</td></tr<>				1 1						posed by planal bytes,
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beep nine 0011 2 Default sening : 0 insec setting Set the beep time from 100 to 300 msec by 50 msec step. Pin no. 19 output the "H" level while the settled time when pen down the touch panel. ·F4 : When receiving a new command while receiving a plural composed commands. Codes 00h 01h 02h 03h 04h 05h 'H' level time (msec) 0 100 150 200 250 300 Security class C IssUANCE May.20,2019 /// May.20,2019 /// May.20,2019 'Other wide wide mission barget /// /// /// /// /// ///	<u> </u>	Poor time	046							ie arrei ine nine our nine
Set the beep time from 100 to 300 msec by 50 msec step. Pin no. 19 output the "H" level while the settled time when pen down the touch panel. sends "F4h" to the host CPU. Notice : Error code "F2" doesn't correspond to all plural composed commands. Codes 00h 01h 02h 03h 04h 05h 'H' level time (msec) 0 100 150 200 250 300 Security diase C Issuance May.20,2019 CHECKED BY: May.2 17 Otherwise species Interview May.20,2019 Interview May.2004/USE THIS 1			•	Δ	2					osed command. the contri
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Image: Wight wigh		I						•		
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ISSUANCE H. Kurashima '17 DIMENSIONS May.20,2019 CHECKED BY: M. Tamura '17 Dimensions range				00210022002	· - · ·					DBY: May 9 STALF
May.20,2019 CHECKED BY: Apr.27 Unless of herwise speci - ONLY YOU CAN USE THIS DRAWING M. Tamura 17 Dimensions range	L								H. Kurast	ima '17 DIMENSIONS
					May.2	20,2019				1/MI.2/
MODEL FT - CSU548(FTCSU548)										
					-50 NOT CC	MODE	LET-CSU	548(FTCS	U548) H. Kadowa	ki '17 Over 6 up to 30

PRODUCT SPECIFICATIONS 9/19

9. USB SPECIFICATION AND COMMANDS

9-1. USB Specification

ITEM	CONTENTS
USB Specification	USB 2.0 Full Speed
Power source	BUS-powered/Self-powered
Device class	Vendor specific
Endpoint	EPO:8 byte (Control transfers) Descriptor and vendor commands EP1:4 byte (Interrupt transfers) Coordinate data
Frame interval	1 msec
Vendor ID	16C3h
Product ID	FC10h

9-2. Commands for using USB

(1). Sampling rate

R

С

D

Ε

F

(a) Default setting: 80(p/s)

(b) Sends an optional value 10 to maximum (p/s) according to the following format.

bmRequestType	bRequest	wValue	wIndex	wLength	Data
01000000B (40h)	91h	Sampling rate value (Note)	0	0	None

- Note : Becareful not to settle more than the maximum sampling rate. The coordinate data may becomes abnormal. There is a maximum sampling rate of each mode as follows :
 - Calibration data mode 130 (p/s) Source data mode - 190 (p/s)

(2). Coordinates mode

(a) Default setting: Calibration data mode

2

(b) Source data mode

bmRequestType	bRequest	wValue	wIndex	wLength	Data
01000000B (40h)	80 h	0	0	0	None

(c) Calibration data mode

bmRequestT	јуре	bRequest	wValue	wIndex	wLength	Data
01000000B	(40h)	81h	0	0	0	None

(3). Data output mode

(a) Default setting: Stream mode

(b) Point mode

bmRequest⊺ype	bRequest	wValue	wIndex	wLength	Data
0100000B (40h)	A0h	0	0	0	None

(c) Stream mode

bmRequestType	bRequest	wValue	wIndex	wLength	Data
0100000B (40)) A1h	0	0	0	None

(4). Duplicate coordinate processing function

(a) Default setting: Enable duplicate coordinate processung

(b) Enable duplicate coordinate processing

bmRequestTyp)e	bRequest	wValue	wIndex	wLength	Data
0100000B (4	40h)	84h	0	0	0	None

(c) Disenable duplicate coordinate processing

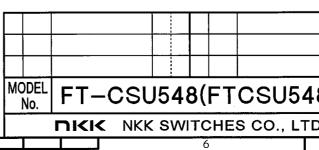
bmRequest1	Гуре	bRequest	wValue	wIndex	wLength	Data
0100000B	(40h)	85 h	0	0	0	None

(5). Lock function (a) Lock condition

• •						
	bmRequestType	bRequest	wValue	wIndex	wLength	Data
	0100000B (40h	EOh	0	0	0	None

(b) Lock clear

bmRequestType	bRequest	wValue	wIndex	wLength	Data
0100000B (40h)	E1h	0	0	0	None



様式 No.6435

8



NKK SWITCHES CO., LTD.

	APPROVED BY:	May.9	SCALE:		
	 H, Kurashima		QIMENSIONS I	Nmp	
	 CHECKED BY:	Apr.27	Unless otherwise specifi	ed tolerances	
	M. Tamura	17	Dimensions lange	Tolerances	
<u> </u>	CHECKED BY:	Apr.18	Up to 6	±0,3	F
.8)	H. Kadowaki	17	Over 6 up to 30	±0.5	
-	DRAWN BY:	Apr.14	Over 30 up to 50	±8,8	
D.	S. Kurihara	· 17	øver 50	±1.2	
	7 No. 19054	5	1E-FT-CSU548	_9(海外形名)	
		1			

PRODUCT SPECIFICATIONS 10/19

(6). Host CPU data output function

(a)Default setting : Pin no. 36 & 38 are "L" level

(b) Host CPU data output

bmR	leques	tТуре	<u>-</u>	bRequ	est	wValı	Je	wInde	ex W	Length	Data	
0100	0000B	(4()h)	A2h		See be	OW	0		0	None	
Set "C)" to t	he bi	t "z0'	" or "z	1" to	outpu	t "L"	level	and	set "1" f	or the "	H" level.
bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	_ [Bit	Pin No.		
0	0	0	0	0	0	z1	z0	7 F	z0	36		

В

Δ

| 0 | 0 | 0 | 0 | 0 | 0 | z1 | z0 |

The controller chip starts from default setting after reboot, no matter with or without E2PROM.

38

z1

(7). Status function

bmRequestType	bRequest	wValue	wIndex	wLength	Data
11000000B (COh)	C3h	See below	0	01h	None

Mode	wValue	Return value
Coordinates calculation method	00h	01h:Source data mode 02h:Calibration data mode
Data output mode	01h	01h:Stream mode 02h:Point mode
Sampling rate	03h	Value of sampling rate
Duplicate coordinate processing function	06h	00h:Duplicate coordinate processing function disenable 01h:Duplicate coordinate processing function enable
Lock function	08h	00h:lock condition 01h:lock clear
Host CPU data output function	0Bh	0xh : x=Data from host CPU
With/without E2PROM 4/5 wire touch panel	0Dh	0xh : x=0,0,21,20 Z0 : 0-4 wire Z1 : 0-Without E2PROM 1-5 wire 1- With E2PROM

(8). Clear E2PROM data

bmRequestType	bRequest	wValue	wIndex	wLength	Data
01000000B (40h)	C5h	0	0	0	None

(9). Beep time setting

(a)Default setting: 0 msec

(b)

F

様式 No.6435

bmRequestType	bRequest	wValue	wIndex	wLength	Data
01000000B (40h)	86 h	See below	0	0	None

3

Set the beep time from 100 to 300 msec by 50 msec step. Pin no. 33 output the "H" level while the settled time when pen down the touch panel.

F '						
	00h					
"H" level time (msec)	0	100	150	200	250	300

2

(10). Calculate Calibration ratio

bmRequestType	bRequest	wValue	windex	wLength	Data
01000000B (40h)	83h	2h	0	000Fh	Data format as follows

According to the following format, controller calculate and sets a calibration ratio.

bit7	bit6	bit5	bit4	bit3	bit2	bit1	BitO	
0	0	0	0	xЗ	x2	x1	x0	The 1st LCD re x0~x9:The bi
0	0	x9	x8	х7	x6	x5	х4	coordi
0	0	0	0	yЗ	y2	y1	y0	y0~y9:The bi coordi
0	0	y9	y8	y7	y6	y5	y4	(x9, y
0	0	0	0	XЗ	X2	X1	XO	The 2nd LCD r
0	0	Х9	X8	X7	X6	X5	Χ4	coord
0	0	0	0	Y3	Y2	Y1	Y0	Y0~Y9:The b coordi
0	0	Y9	Y8	Y7	Y6	Y5	Y4	(x9, y
0	0	0	0	Ax3	Ax2	Ax1	Ax0	The A/D value Ax0~Ax9:The
0	0	Ax9	Ax8	Ax7	Ax6	Ax5	Ax4	
0	0	0	0	АуЗ	Ay2	Ay1	Ay0	Ay0~Ay9:The axis
0	0	Ay9	Ay8	Ay7	Ay6	Ay5	Ay4	(x9,
0	0	0	0	EXA	AX2	AX1	AX0	The A/D value
0	0	AX9	AX8	AX7	AX6	AX5	AX4	
0	0	0	0	AY3	AY2	AY1	AY0	AY0~AY9:The axis
0	0	AY9	AY8	AY7	AY6	AY5	AY4	(×9,

*The absolute value of margin between the A/D value (AX,AY) of the 2nd reference point and the A/D value (Ax, Ay) of the 1st reference point are as follows. |AX-Ax|>100, |AY-Ay|>100

* More than 50 msec interval is required between the last calibration command (16 bytes) and next command.

Γ											
М	OE N	DEL o.	FT-(CSL	J5	48	B (FT	CS	U5	48
			אאח	NKK	S	WI	тс	HE	s cc)., L	TD
	Τ						6		_		

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R

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eference point

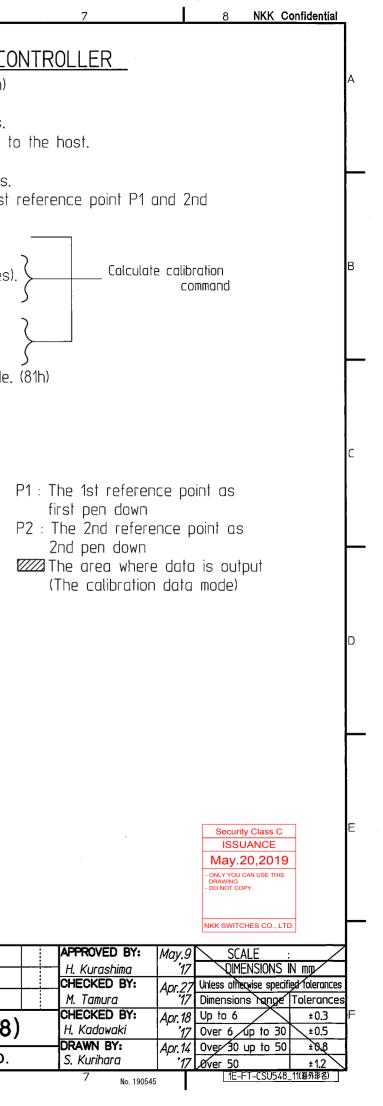
pinary number of the horizontal axis linates x of the 1st reference point pinary number of the vertical axis linates y of the 1st reference point y9 are the high-order bit). reference point binary number of the horizontal axis dinates X of the 2st reference point binary number of the vertical axis dinates Y of the 2st reference point y9 are the high-order bit). e of the 1st reference point binary number of the A/D value which horizontal is coordinates x of the 1st reference point ne binary number of the A/D value which vertical is coordinates y of the 1st reference point , y9 are the high-order bit). e of the 2nd reference point e binary number of the A/D value which horizontal is coordinates X of the 2nd reference point ne binary number of the A/D value which vertical

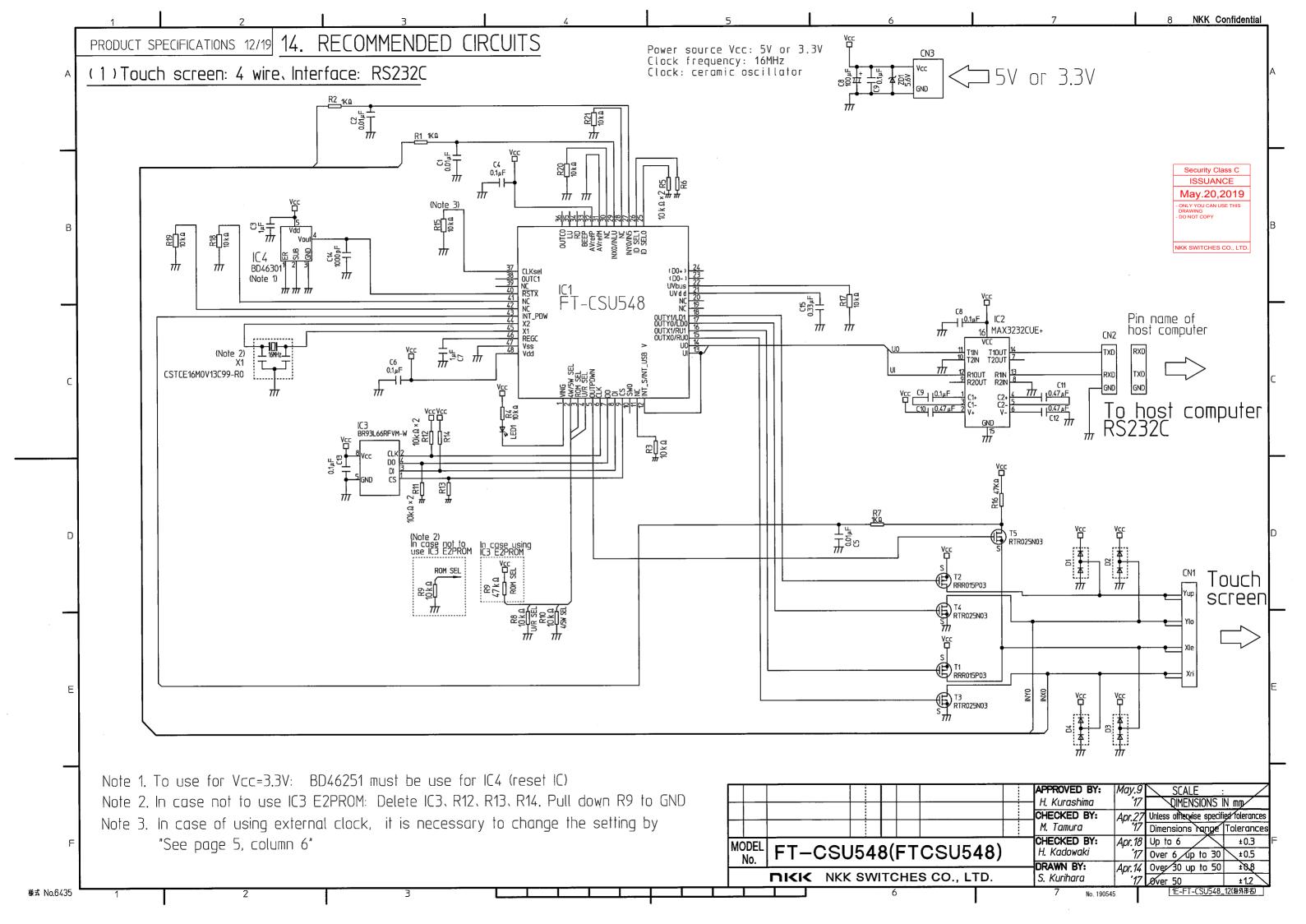
is coordinates Y of the 2nd reference point 9, y9 are the high-order bit).

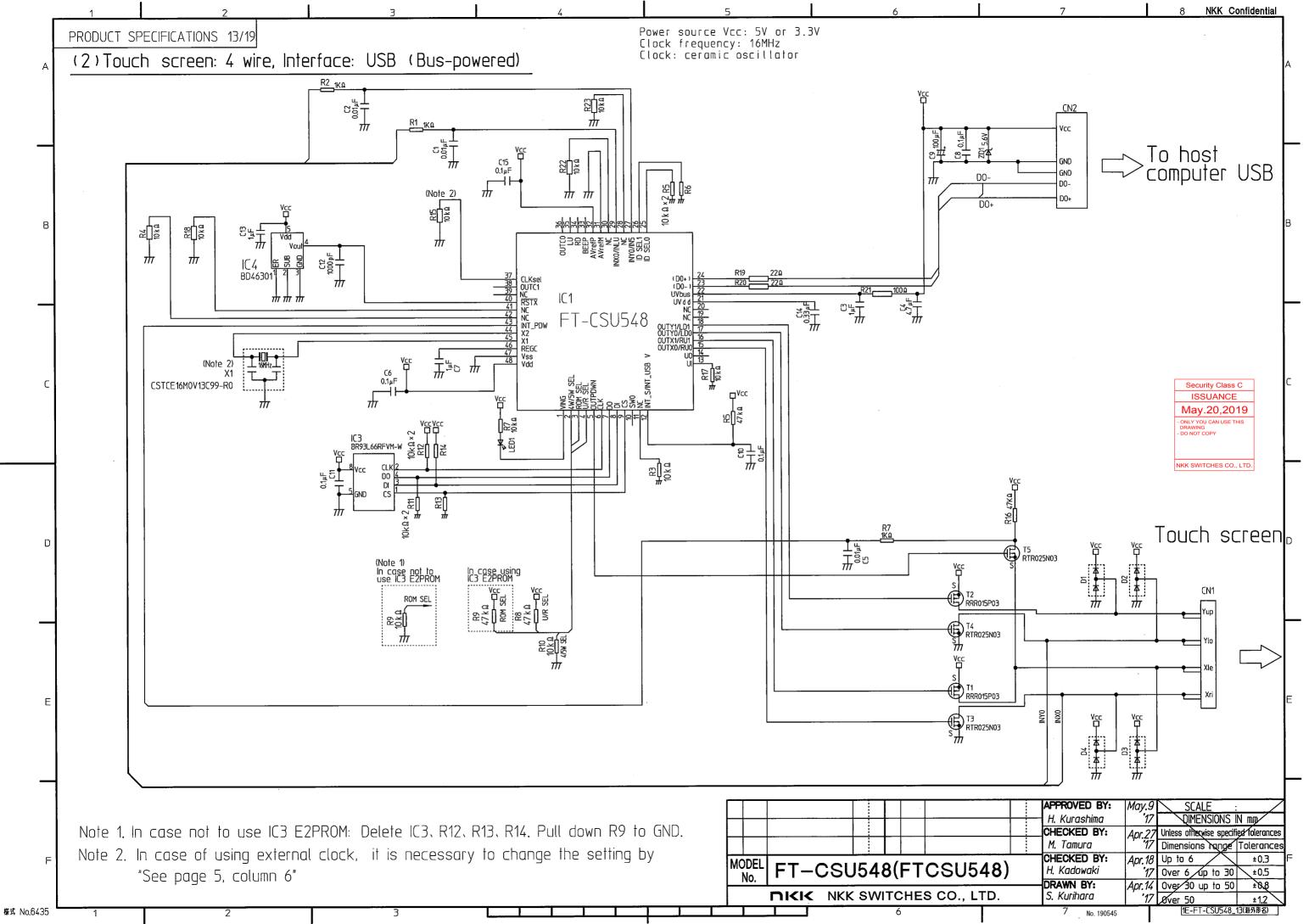
			ISSUANC	E
			May.20,20	019
			- ONLY YOU CAN USE DRAWING - DO NOT COPY	THIS
			NKK SWITCHES CO	D., LTD.
	APPROVED BY:	May.9	SCALE	:
	H. Kurashima	17	QIMENSIONS	N mp
	CHECKED BY:	Apr.27	Unless otherwise speci	fied folerances
	M. Tamura	17	Dimensions hange	Tolerances
<u> </u>	CHECKED BY:	Apr.18	Up to 6	±0.3 F
8)	H. Kadowaki	17	Over 6 up to 30	±0.5
	-DRAWN BY:	Apr.14	Over 30 up to 50	±0.8
D.	S. Kurihara	17	Øver 50	±1.2
	7 No. 1905	45	1E-FT-CSU548	_10(海外形名)

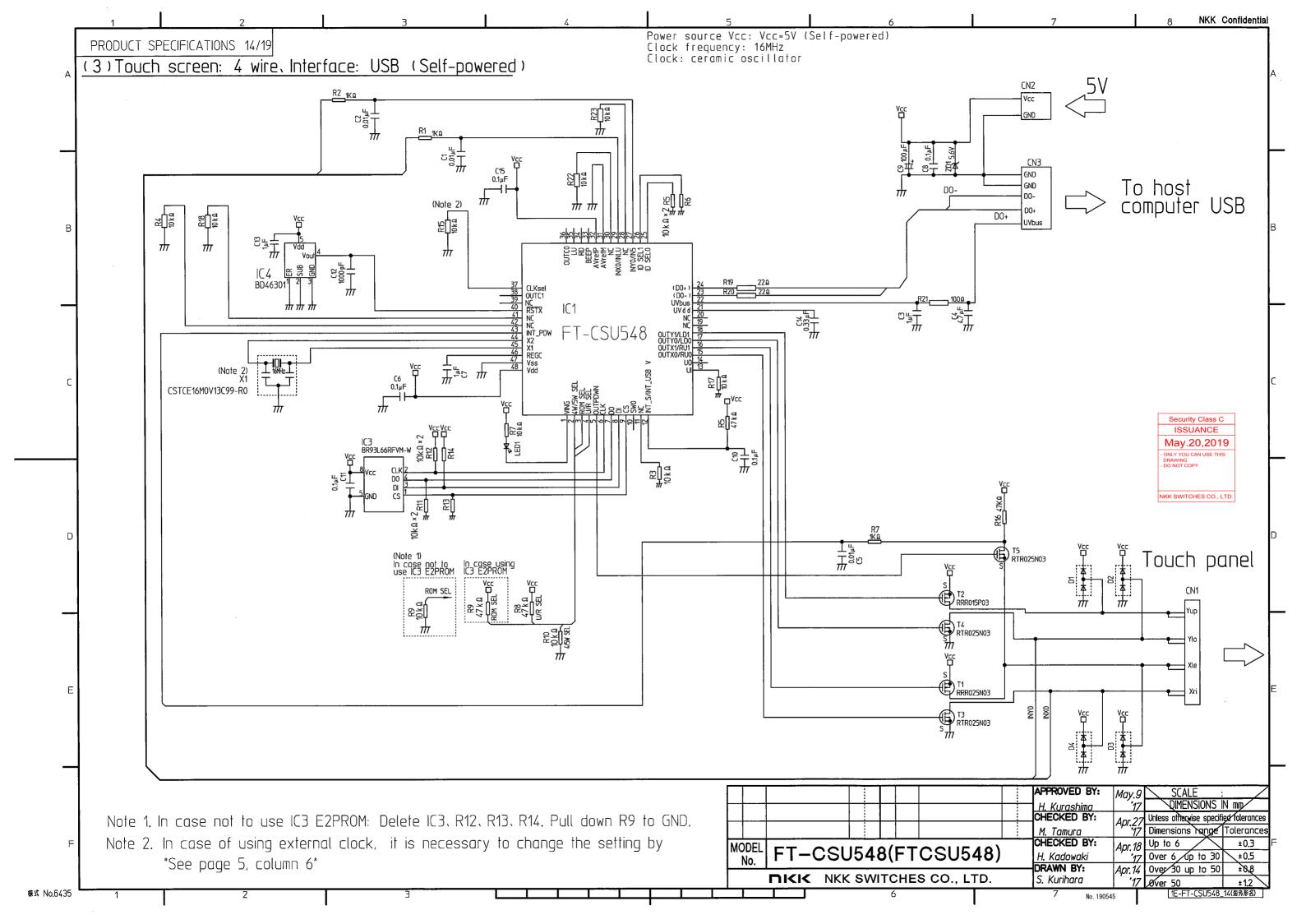
Security Class C

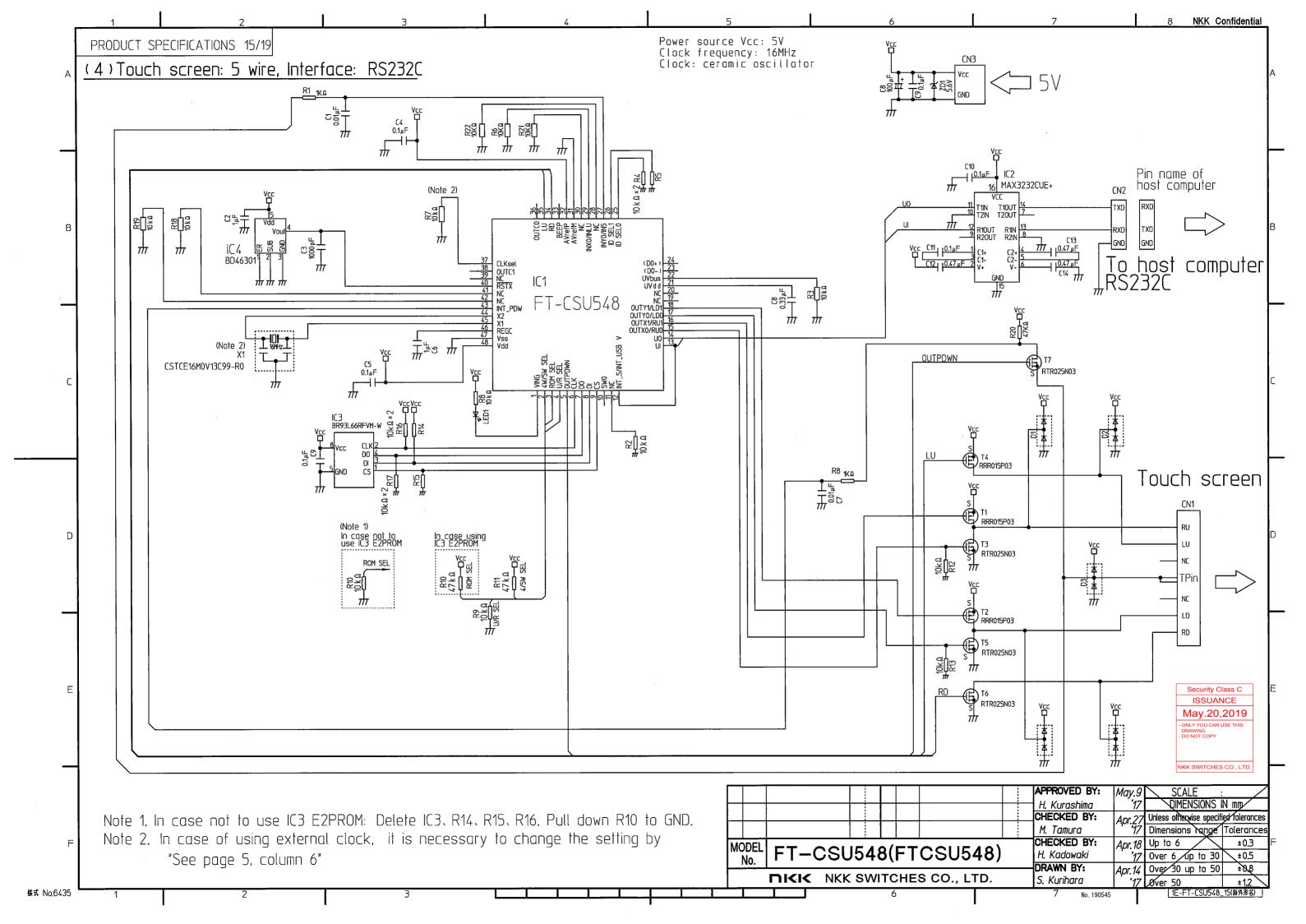
_	1 2 3 4	5 6
	PRODUCT SPECIFICATIONS 11/19	13.HOW TO SET CALIBRATION RATIO TO CO
A	10.FORMAT OF THE COORDINATE DATA (4-BYTE) bit 7 6 5 4 3 2 1 0 ph 0 0 P X3 X2 X1 X0 1st byte 0 0 X9 X8 X7 X6 X5 X4 0 1 1 SW0 Y3 Y2 Y1 Y0 3rd byte 0 0 Y9 Y8 Y7 Y6 Y5 Y4 4th byte ph Phase bit , always set to 1. P Pen status (pen down=1, pen up=0) *0 * Always set to 0.	 (a) Set the controller to the source data mode (80h) (b) Display the 1st reference point P1 to the LCD. (c) Touch the 1st reference point P1 with the stylus. (d) Save the source data mode of the 1st set point (e) Display the 2nd reference point P2 to the LCD. (f) Touch the 2nd reference point P2 with the stylus. (g) Host computer receive the A/D value of each 1st reference point P2. (h) Send a calibration ratio command code (83h). (i) Send the LCD coordinates value of each
D	X0 to X9 :The binary number of horizontal axis coordinates value (X). (X9 is the high-order bit) Y0 to Y9 :The binary number of vertical axis coordinates value (Y). (Y9 is the high-order bit) According to the pen up code setting, it outputs.pen up code data.	 1st (P1) and 2nd (P2) reference point (8 bytes P1→P2 (j) Send the A/D value of each 1st (P1) and 2nd (P2) reference point (8 bytes). P1→P2 (k) Switch the controller to the calibration data mode
C	 (a)Pen up code setting: 1 byte (Only RS232C communication) It outputs "80h" as the pen up code data. (b)Pen up code setting: 4 bytes (RS232C and USB) The pen up data would be as follows ph (phase bit): 1 p (pen status): 0 coordinate data (X0-X9,Y0-Y9): All "0" 	Touch panel LCD
D	Notice: During and after reset, the controller chip sometimes send invalid data (ex. 00h, FFh, F0h, etc.). Please ignore these data by host CPU.	
_	11.NOTICE TO USE E2PROM (1) When using the E2PROM, the updated commands (except "Host CPU data output function") are stored to E2PROM and after reboot the chip will start from the updated status. In order to clear the data of E2PROM please follows the steps below.	
E	 (a) Send E2PROM clear command (C5h) (b) Reset the controller chip (2) There is the limitation for number of data rewrite times to E2PROM. Please avoid to send the commands often from host CPU. (3) If EEPROM is not used, IC settings are initialized after reset. 	
	12.ABOUT THE INTERVAL TIME	
F	When wake up from stop mode or resetting controller (hardware reset, software reset, power on reset, watch dog reset), the stable time of controller must be taken. The interval time must be more than 50 (ms).	MODEL No. FT-CSU548(FTCSU548 ■IKIK SWITCHES CO., LTD.
様式 No.6435	1 2 3	6

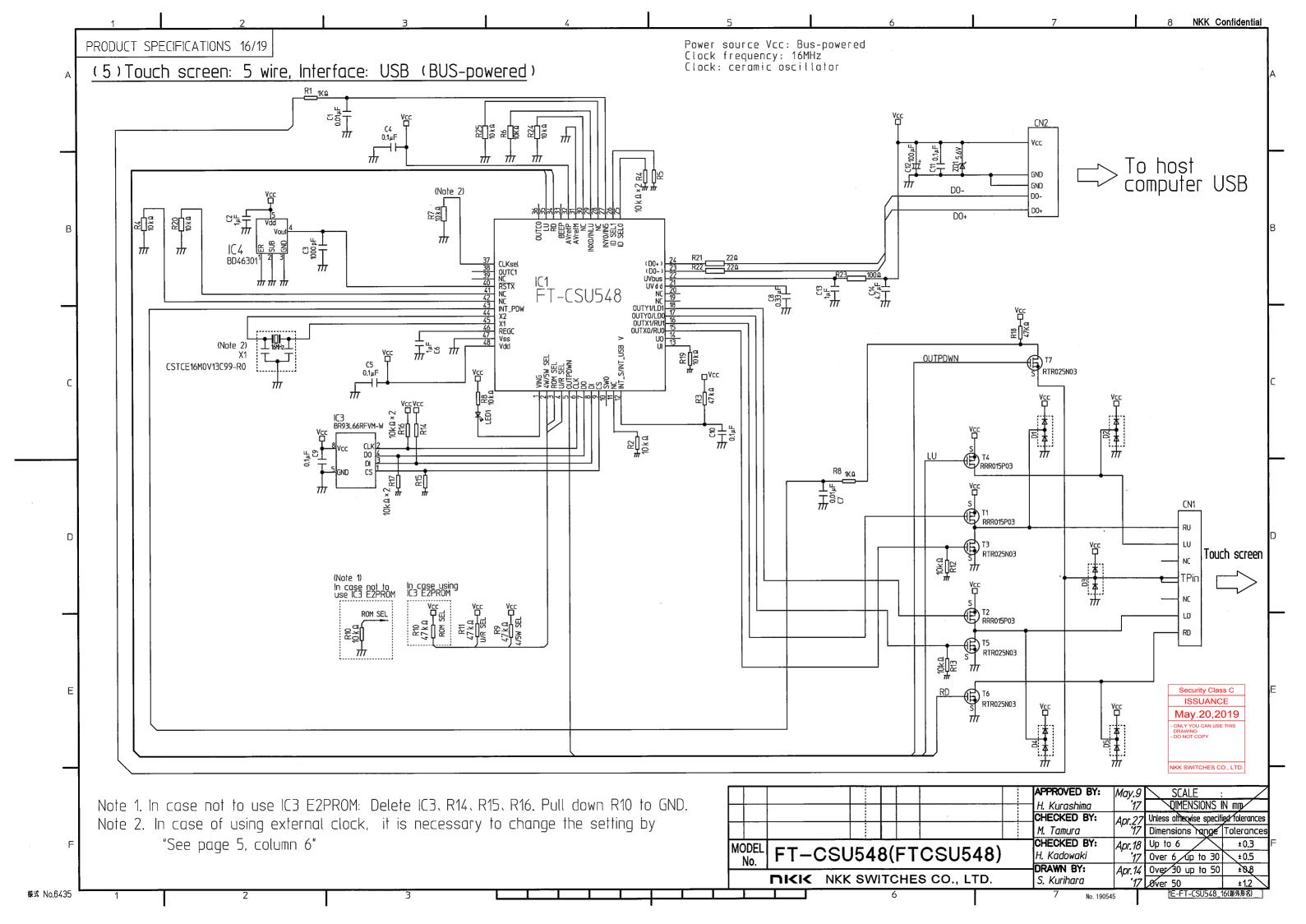


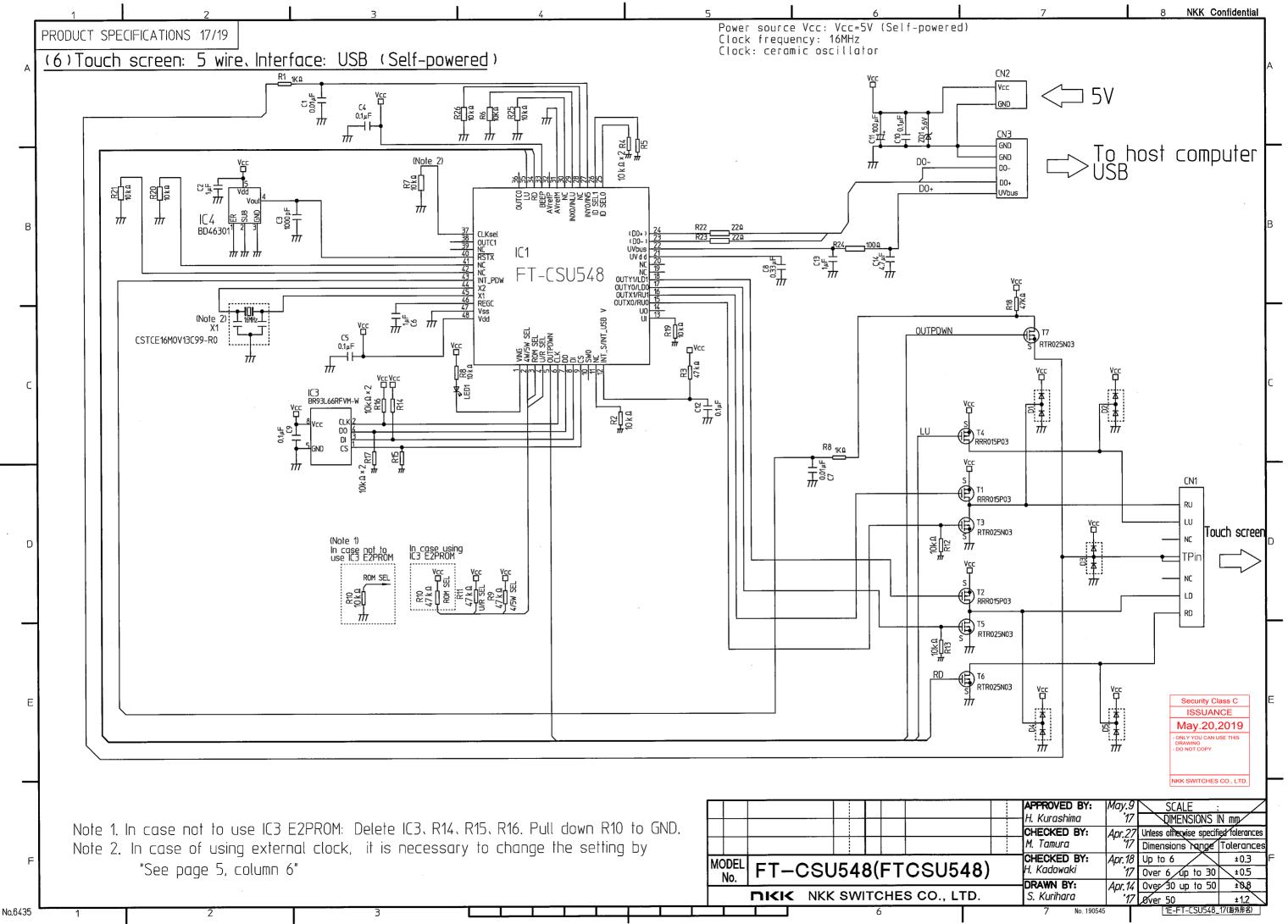












様式 No.6435

PRODUCT SPECIFICATIONS 18/19

ITEM

Storage conditions

Hot air reflow/

Infrared reflow

Acceptable mouting conditions

15. RECOMMENDED MOUNTING CONDITIONS

15-1. Temperature profile for hot air reflow/infrared reflow sceme

Package surface

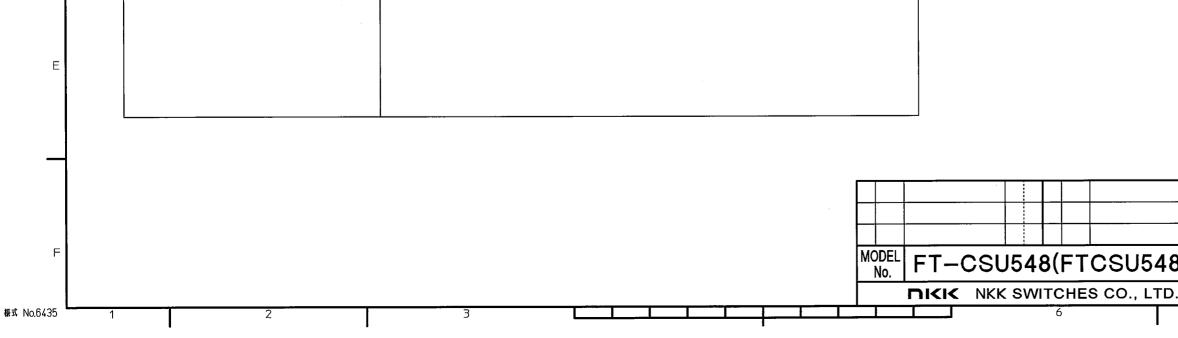
temperature

(°C



2.	2. Manual soldering (partial heating method)								
	ITEM	CONTENTS							
	Storage conditions	5~30°, 70%RH or less							
	Mounting conditions	 Maximum temperature(350° or less) Time: 3 sec. max./pin Number of mounting: 1 time 							

15-3. Full solder dipping Note that the use of full solder dipping should be avoided.



CONTENTS

2 or less

5~30℃、70%RH or less

: 260°MAX : 255° Peak humidity time (-5°) : Solder melting point or higher (time of over 217°): 60~150s : Preheat area time (150~200°) : 60~120s

Time(s) <Temperature profile for hot air reflow>

Note • The solder melting temperature varies with the substrate and paste material used. For the experimental temperature profile, please use the optimum temperature under the presentation conditions

(Main heating)

_60~150s

260°MAX

217°C

255℃ Time: 30 sec. max./pin

IC body upper surface temperature

200%-

-150℃

60~120s (Preheat)

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	APPROVED BY:	May.9	SCALE	:	
	— H. Kurashima	17	QIMENSIONS	Nmp	
	CHECKED BY:	Apr.27	Unless otherwise specifi	ied tolerances	
	M. Tamura	· 17	Dimensions lange	Tolerances	
	CHECKED BY:	Apr.18	Up to 6	±0.3 F	-
18)	H. Kadowaki	.17	Over 6 up to 30	±0.5	
-	DRAWN BY:	Apr.14	Over 30 up to 50	±0.8	
D.	S, Kurihara	' '1 7	Øver 50	±1.2	
	7 No. 190545		[1E-FT-CSU548_	18(海外形名)	

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 (10). Precautions related to usage of devices (10). Precautions related to usage of devices This controller chip is intend for use in standard application (computers, office automation, other office equipment, industrial, communications, and measurement equipment, personal or household devices, etc.) This controller chip is NOT intend to use in special applications where failure or abnormal operation may directly affect human lives or cause physical injury or property damage or where extremely high levels of reliability are demanded, such as aerospace systems, atomic energy controls, sea floor repeaters, vehicle lit is recommended to have the matching investigation by ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (11). To use ceramic resonator or quarts-crystal oscillator for clock (12	_	1	2	3	I	4	5	i .	1	6	L
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 16-1. Preculsus fig profile damped by updation of sheek holding, current tergentine with the profile damped by updation of sheek holding, current tergentine with the profile damped by updation of sheek holding. Current tergentine with the profile damped by updation to a sheek holding. Current tergentine with the profile damped by updation to a sheek holding. Current tergentine with the profile damped by updation to a sheek holding. Current tergentine with the profile damped by updation the sheek holding. Current tergenting the updation tergenting the tergenting terms of the profile damped by updation the sheek holding. Current tergenting the tergenting terms of the terms of the terms of the tergenting terms of the terms of	A	6. NOTES C	N USE				16-4. Precau	tions for use e	nvironment		
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 (a) Be such that he voltage applied to priss do not exceed the develoption notings. This should include enterships a homomal cause same prevensation. (b) Flack-loading voltage of power source may causes the program failure. The recommendation of power surce YC criticle is toker than 5 % foll to 6Hzb. (1) Notice on use by settorial clock. All fis-solid eleging The carificiter this have inherently a certain rate of failure. You must protect against injury, domage of heading voltage in a sch. follower beneficited with the protect against injury, domage of the same that is not could be used in the resonance of the protect oparised injury. Advance of the same that is not could be used in the resonance of the protect oparised injury. Advance of the same that is not could be used in the solid enter thancen dispertiting candidars. (1) The protection and prevention of were carcined in the protection of the second method, sadderin that any causes be electrical to a controller chip. The elegin of the second method prevention obsorble. As the wire france hip to fault, pure is an adaption in the second method, sadderin the controller chip is how in the resonance in course faulter and the protection on any prevent levels and the thancen dispertiting candidars. (c) The proceeding is not protein any causes faulter and the adaption of the correction of the second in the second in the obsorbities of the adaption of the second in the second and the second is not second any cause faulter and the second period in any causes be addretical to assend all the responsibilities to the datage in the second in the second in the second in the second the second to a concoder explanation in the second in the second in the second the second to a concoder explanation in the second in the advance of the second in the second the second to a concoder to explanation in the second to a concoder to explanation in the second the second to a concoder explanation in the second to advance in the second the second to a conc	4	or damage t	from high heat, smoke or flame	e. To prevent this from hap	pening, do the fol	lowing				ed packaaed.	To prevent the chip
 (b) Be are lind: downood current flows do not occr during the power-on sequence. (c) 1. After satesing deam of power source moy causes the program failure. The recommendation of power source for crypts is lower than 55 to 10 400°L. (c) 3. Noice on use by external clock the soluble time tusts to taken of the value of from stop mode or reselling controller hardware reset, software reset, nower on resell, wilch dag reset). (d) 1. Follower controller chardware reset, software reset, ower on resell, wilch dag reset). (e) 1. Follower controller chardware reset, software reset, ower on resell, wilch dag reset). (f) 2. Notes on curce drift do using external clock the soluble time inst to take of four powers in the value of four controller chardware reset, software reset, work to controller chardware reset, software reset, ower on reselling controller software reset, software reset, ower on reserving controller chardware reset is of the controller chardware reset. Software reset, or the soluble time is an order of the controller chardware reset is of the controller chardware reset. (f) 1. Nuels on crucits (f) 2. Notes on crucits (f) 2. Notes on crucits (f) 1. Nuels on crucits (f		(a) Be sure that	the voltage applied to pins o	do not exceed the absolute	e maximum ratings.					ب ،	
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 sourie Vicr rupte is lower than 5 % (50 to 6Hz). (7) I. Meller on use by externed dock. Mso in uses of using externed dock the stable time must be token after wake up fram stop mode or reselling controller brank our reset, software reset, power on reset, which dog reset). (8) Fol-sofe design. The controller chips have inherently a certain rede of failure. You must protect against injury, danage or tokes an orchuit. (9) Notes on circuits. (10) Notes on circuits. (11) Allows on Chronization of a prevention of over-current levels and other durantial queriality carditors. The package must not resonable. It is the damage that cantroller chip is totach parts and ongo the electrical parts and wave the electrical parts and wave to make the damage that cantroller chip is controller chips in the damage that computes. This controller chips in clark for a dipart damage or ubrase extensibly high levels or related throw the damage that controller chips in the damage that computes. This controller chips in the damage that controller chips is a divice for the support. etc. (11) The controller chips in the damage typical in jury or properly damage or where extremely high levels or related throw the support, etc. (11) The controller chips in location where there are presention roughest in the product. Store the controller chips is and three specific to make the externed to the loss of damage that inclusion in the support end in the damage or othere extended to the loss of the damage or vicrose appression or howether chips is a damage or there extended there is a store of the damage that inclusion the drives or play-ond play to cornect the controller chips in the damage the play to cornect the controller chips in the damage the play to cornect the support. (10) The controller chips in the damage the play to cornect the controller chips in the controller chips in the cornection or quarks-crystal collabor on there dave and play to cor				a may causes the program	failure The reco	mmendation of nower	(3). Do	not touch of D	USN THE PRINT	ed surrace un	itil the cleaning fluic or time when colderi
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DRAWN BY:

S. Kurihara

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