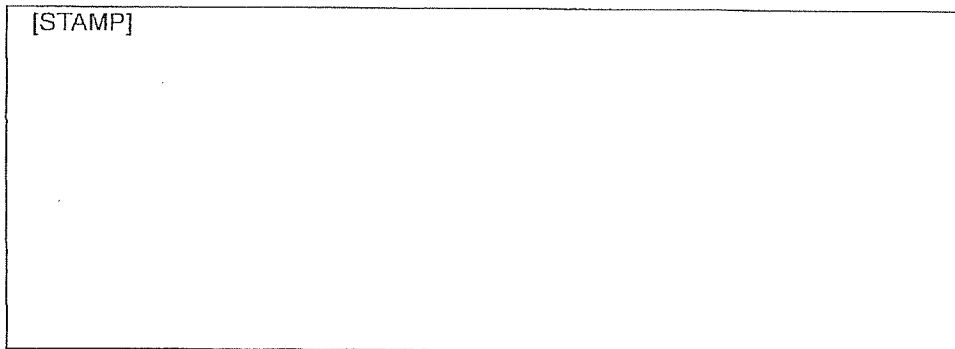


**Messrs: Beceem**

**Preliminary Specification**

Customer part number	-
Customer specification Number	-
Product	Quartz Crystal
Model	CX-2520SB
Frequency	24000kHz
Part Number	CX2520SB24000D0PESZZ

**Pb Free, RoHS Compliant**



**Sales office**  
 KYOCERA Corporation  
 (Electronic Components Sales Division)  
 Head Office 6 Takeda Tobadono-cho, Fushimi-ku,  
 Kyoto 612-8501 Japan  
 TEL 075-604-3500  
 FAX 075-604-3501

**Production**  
 KYOCERA KINSEKI Corporation  
 (Crystal Unit Sales Promotion Division)  
 1-8-1, Izumi-honcho, Komae-Shi,  
 Tokyo 201-8648 Japan  
 TEL 03-5497-3111  
 FAX 03-5497-3209

<b>Design</b> KYOCERA KINSEKI Yamagata Co. Crystal Units division	<b>Issued by</b> <i>T. Mitsuoka</i>	<b>Approved by</b> <i>J. Takahashi</i>
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※Recycled paper is being used for the conservation of nature.

No. K1101-06231-311

2(11)

Date: 2006/ 8/25

**Change History**

Rev	DESCRIPTION	DATE	DRAWN	CHECKED	APPROVED
0	Preliminary spec release	2006/ 8/25	<i>T. Nishida</i>		<i>[Signature]</i>

### 1. APPLICATION

This specification sheet is applied to quartz crystal "CX-2520SB".

### 2. PART NUMBER

CX2520SB24000D0PESZZ

### 3. RATINGS

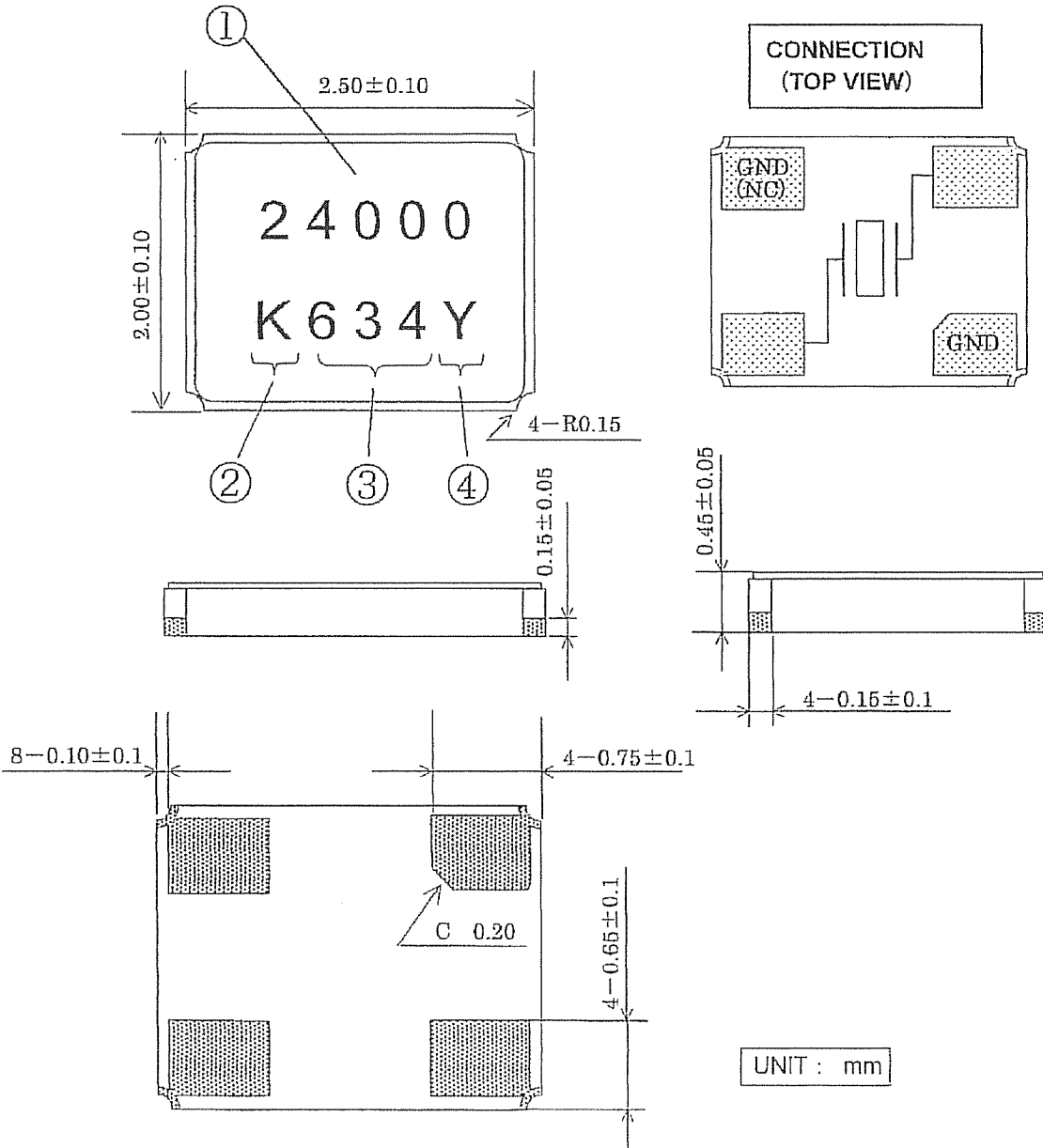
Items	SYMB.	Rating	Unit	Remarks
Operating Temperature	Topr	-10~+70	deg. C	
Storage Temperature range	Tstg	-40~+85	deg. C	

### 4. CHARACTERISTICS

#### ELECTRICAL CHARACTERISTICS

Items	Electrical Specification					Test Condition	Remarks
	SYMB.	Min	Typ.	Max	Unit		
Mode of Vibration		Fundamental					
Nominal Frequency	F0		24		MHz		
Nominal Temperature	T <sub>NOM</sub>		25		deg. C		
Load Capacitance	CL		8.0		pF		
Frequency Tolerance	df/F	-50.0		50.0	PPM	25±5°C Network Analyzer E5100A 200 μA	
Frequency Temperature characteristics	df/F	-50.0		50.0		-10~+70°C	
Frequency Ageing Rate		-1.0		1.0		1 year	25±5°C
Equivalent Series Resistance	ESR			100	Ohms	Network Analyzer E5100A 200 μA	
Drive Level	Pd	0.004		0.1	MW		
Insulation Resistance	IR	500			M ohms	100V(DC)	

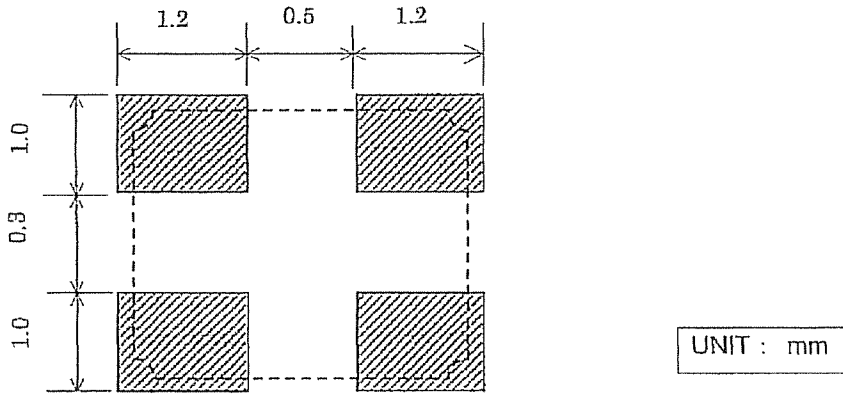
**5. APPEARANCES, PHYSICAL DIMENSION**  
**OUTLINE DIMENSION (not to scale)**



**MARKING**

- ① Nominal Frequency Move the number of maximum indication beams of the frequency to five digits, and omit less than kHz.
- ② Identification
- ③ Date Code Year...LAST 1 DIGIT of YEAR AND WEEK ※For details to P11  
(Ex) August 25, 2006 → 634
- ④ Manufacturing Location  
 Y...Yamagata  
 Z...Shiga Yohkaich  
 ※The font of marking is reference.

## 6. RECOMMENDED LAND PATTERN (not to scale)



## 7. Quality Assurance

Location

Kyocera Kinseki Yamagata Corporation ... Kyocera Kinseki Yamagata

Quality Assurance Division

Kyocera Kinseki Corporation Shiga Yohkaichi Plant ... Kyocera Kinseki

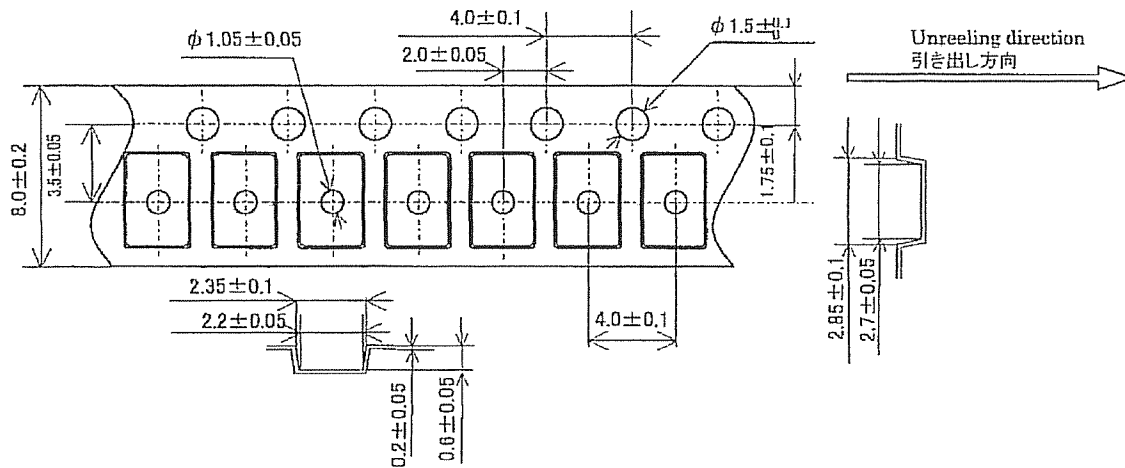
Quality Assurance Division

Quality guarantee

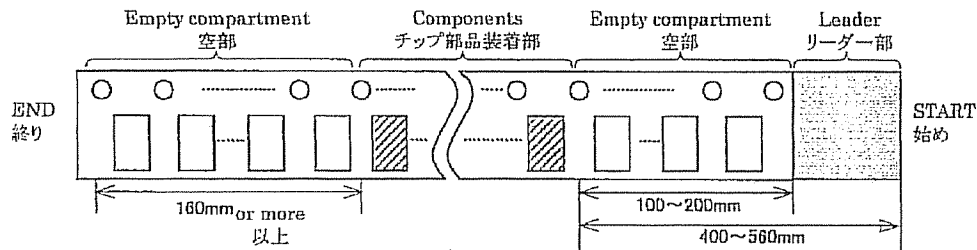
When the failure by the responsibility of our company occurs clearly after delivery within 1 year, a substitute article etc. is appropriated gratuitously and this is guaranteed. However, when passing 1 year after delivery, there is a case where I am allowed to consider as onerous repair after both consultation.

## 8.TAPING&REEL 梱包補助材

### 8-1.Dimensions(寸法図)



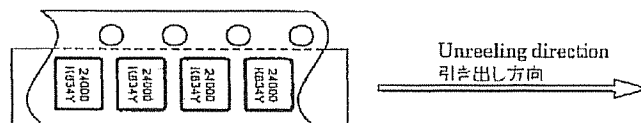
### 8-2.Leader and trailer tape (リーダー部テープ部及び終末端部テープ)



### 8-3.Direction (The direction shall be seen from the top cover tape side)

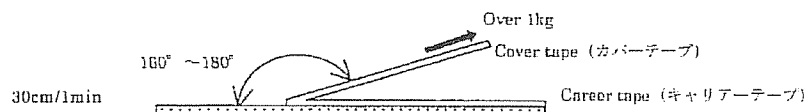
テーピング方向

(トップカバーテープ側から見る。)

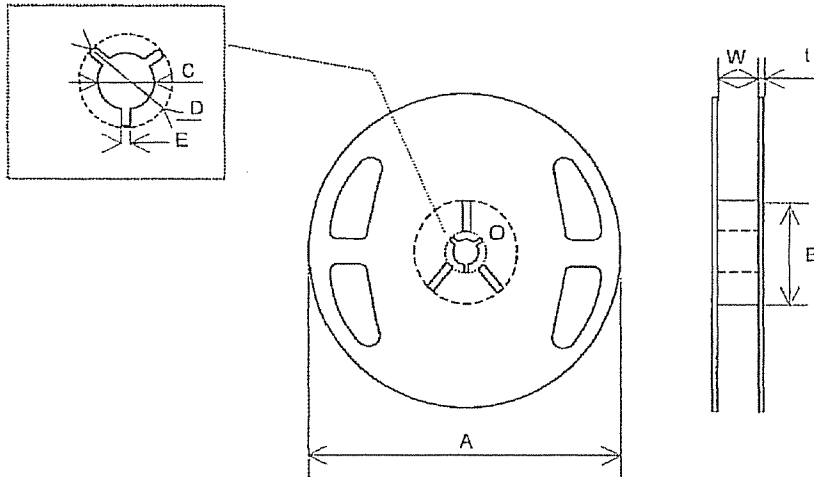


### 8-4.Specification (記事)

1. Material of the carrier tape shall be EC-AP, Polycarbonate, A-PET or PS(all ESD).  
(装着テープの材質は、EC-AP、ポリカーボネイト、A-PET、PS (全て静電対策品) の何れかとする。)
2. Material of the seal tape shall be polyester(ESD). (シールテープの材質はポリエステルとする。(静電対策品))
3. The seal tape shall not cover the sprocket holes. And not protrude from the carrier tape.  
(シールテープは送り穴をふさいだり、装着テープからはみ出していないこと。)
4. Tensile strength of the tape : 10N or more. (テープの引張り強度は10N以上)
5. The R of the corner without designation is 0.2RMAX. (指定無きコーナーのRは0.2RMAX)
6. Disalignment between centers of the cavity and sprocket hole shall be 0.05mm or less. (角穴の中心と送り穴の中心とのずれは、0.05mm以下とする。)
7. Cumulative pitch tolerance of "P<sub>0</sub>" shall be  $\pm 0.2$ mm at 10 pitches. {"P<sub>0</sub>"の累積ピッチ許容差は、10ピッチで $\pm 0.2$ mmとする。}
8. Keep direction of a printing at tape inside. (エンボステープ内における印字は上回の方向とする。)
9. Peeling force of the seal tape: 0.1 to 0.7N. (シールテープ剥離強度 0.1~0.7N)
10. The component can fall headlong naturally from taping in she environment, such dry conditions, when the components were transferred to, cover was removed and the component was moved upside down.  
(カバーテープを外しテープを逆にしたとき、輸送後及び乾燥等の環境下でも自重で部品が落下できる。)



Reel specifications リール



In the case of  $\Phi 180$  Reel (1000 or 3000 pcs)

Symbol	A	B	C	D
Dimension	$\phi 180 +0/-3$	$\phi 60 +1/-0$	$\phi 13 \pm 0.2$	$\phi 21 \pm 0.8$
Symbol	E	W	t	
Dimension	$2.0 \pm 0.5$	$9 \pm 1$	$2.0 \pm 0.5$	

(Unit : mm)

In the case of  $\Phi 330$  Reel (1000 or 3000 or 5000 pcs)

Symbol	A	B	C	D
Dimension	$\phi 330 \pm 0.2$	$\phi 100 \pm 1.0$	$\phi 13 \pm 0.2$	$\phi 21 \pm 0.8$
Symbol	E	W	t	
Dimension	$2.0 \pm 0.5$	$13.5 \pm 0.5$	$2.2 \pm 0.1$	

(Unit : mm)

### 9.Environmental requirements

After following test, frequency shall not change more than  $\pm 20 \times 10^{-6}$

And CI,  $\pm 20\%$  or  $5 \Omega$  of large value.

- 9.1 Resistance to Shock      Test condition  
Natural dropped from height 100cm onto hard wood board in 3 times
- 9.2 Resistance to Vibration      Test condition  
frequency                      : 10—55 —10 Hz  
Amplitude                      : 1.5mm  
Cycle time                      : 15 minutes  
Direction                        : X,Y,Z (3direction),2 h each.
- 9.3 Resistance to Heat              Test condition  
The quartz crystal unit shall be stored at a temperature of  $+85 \pm 2^\circ\text{C}$  for 500 h.  
Then it shall be subjected to standard atmospheric conditions for 1 h ,after which measurement shall be made.
- 9.4 Resistance to Cold              Test condition  
The quartz crystal unit shall be stored at a temperature of  $-40 \pm 2^\circ\text{C}$  for 500 h.  
Then it shall be subjected to standard atmospheric conditions for 1 h ,after which measurement shall be made.
- 9.5 Thermal Shock                  Test condition  
The quartz crystal unit shall be subjected to 500 successive change of temperature cycles , each as shown in table below, Then it shall be subjected to standard atmospheric conditions for 1h, after which measurements shall be made.  
Cycle                                :  $-40 \pm 2^\circ\text{C}$  (30min.)  $\sim 25 \pm 2^\circ\text{C}$  (5min.)  
    $\sim +85 \pm 2^\circ\text{C}$  (30min.)  $\sim 25 \pm 2^\circ\text{C}$  (5min.)



9.6 Resistance to Moisture

Test condition

The quartz crystal unit shall be stored at a temperature of  $60 \pm 2^\circ\text{C}$  with relative humidity of 90% to 95% for 240 h. Then it shall be subjected to standard atmospheric conditions for 1h, after which measurements shall be made

9.7 Soldering condition

1.) Material of solder

Kind ... lead free solder paste

Melting point ...  $220 \pm 5^\circ\text{C}$

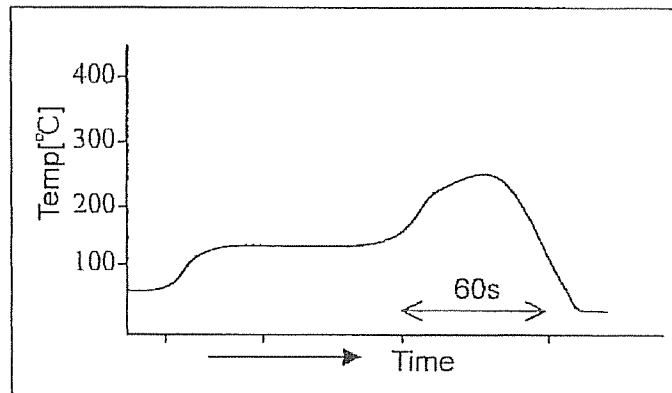
2.) Temp.profile of reflow soldering system

	Temp [ $^\circ\text{C}$ ]	Time[sec]
Peak	$260 \pm 5$	10 (max.)
Preheating	180 (typ.)	100 (typ.)
Total	—	200 (max.)

Reflow times : 2times

Frequency shift :  $\pm 2\text{ppm}$

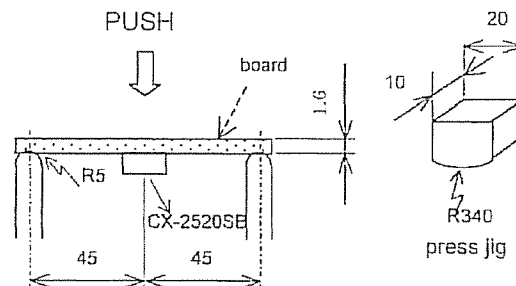
Temp. profile of reflow



9.8 Intensity for bending in circuit board

Solder this product in center of the circuit board of  $40\text{mm} \times 100\text{mm}$ , and add the deflection of 3mm as the bottom figure.

Test board :  $t = 1.6\text{mm}$



UNIT : mm

**10. Cautions for use****(1) Automatic mounting machine use**

Please use after affirmation that select the mounting machine model with a shock small if possible in the case of use of an automatic mounting machine, and it does not have breakage. There is a risk of a crystal oscillating child's breakage occurring and not functioning normally by too much shock etc.

**(2) Conformity of a circuit**

In case of use of an oscillation circuit, please insert in a crystal oscillating child in series resistance 5 time as many as the standard value of equivalent in-series resistance, and confirm oscillating. Please remove resistance which inserted after the notes above-mentioned examination in the crystal oscillating child in series, and use it.

**11. Storage conditions**

Storage at prolonged high temperature or low temperature and the storage by high humidity cause degradation of frequency accuracy, and degradation of soldering nature. Storage is performed at the temperature of 18-30 degrees C, and the humidity of 20-70 Percent in the state of packing, and a term is 6 months.

**12. Others**

When any questions and opinions are in the written matter of these delivery specifications, I will ask connection of you from the our company issue day within 45 days. In a connection no case, a written matter is consented to it and employed within a term.

Date: 2006/ 8/25

### 13.LOT CALENDAR

WEEK	MONTH	SUN	MON	TUE	WED	THU	FRI	SAT	WEEK	MONTH	SUN	MON	TUE	WED	THU	FRI	SAT
週	月	日	月	火	水	木	金	土	週	月	日	月	火	水	木	金	土
0601	1	1	2	3	4	5	6	7	0628	7	9	10	11	12	13	14	15
0602		8	9	10	11	12	13	14	0629		16	17	18	19	20	21	22
0603		15	16	17	18	19	20	21	0630		23	24	25	26	27	28	29
0604		22	23	24	25	26	27	28	0631	8	30	31	1	2	3	4	5
0605	2	29	30	31	1	2	3	4	0632		6	7	8	9	10	11	12
0606		5	6	7	8	9	10	11	0633		13	14	15	16	17	18	19
0607		12	13	14	15	16	17	18	0634		20	21	22	23	24	25	26
0608		19	20	21	22	23	24	25	0635	9	27	28	29	30	31	1	2
0609	3	26	27	28	1	2	3	4	0636		3	4	5	6	7	8	9
0610		5	6	7	8	9	10	11	0637		10	11	12	13	14	15	16
0611		12	13	14	15	16	17	18	0638		17	18	19	20	21	22	23
0612		19	20	21	22	23	24	25	0639		24	25	26	27	28	29	30
0613	4	26	27	28	29	30	31	1	0640	10	1	2	3	4	5	6	7
0614		2	3	4	5	6	7	8	0641		8	9	10	11	12	13	14
0615		9	10	11	12	13	14	15	0642		15	16	17	18	19	20	21
0616		16	17	18	19	20	21	22	0643		22	23	24	25	26	27	28
0617		23	24	25	26	27	28	29	0644	11	29	30	31	1	2	3	4
0618	5	30	1	2	3	4	5	6	0645		5	6	7	8	9	10	11
0619		7	8	9	10	11	12	13	0646		12	13	14	15	16	17	18
0620		14	15	16	17	18	19	20	0647		19	20	21	22	23	24	25
0621		21	22	23	24	25	26	27	0648	12	26	27	28	29	30	1	2
0622	6	28	29	30	31	1	2	3	0649		3	4	5	6	7	8	9
0623		4	5	6	7	8	9	10	0650		10	11	12	13	14	15	16
0624		11	12	13	14	15	16	17	0651		17	18	19	20	21	22	23
0625		18	19	20	21	22	23	24	0652		24	25	26	27	28	29	30
0626	7	25	26	27	28	29	30	1	0653		31						
0627		2	3	4	5	6	7	8									