

FURUNO

OPERATOR'S MANUAL

FACSIMILE RECEIVER

MODEL FAX-215



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NISHINOMIYA, JAPAN

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* 0 0 0 8 0 5 6 6 1 0 0 *



* O M E 6 2 5 6 0 E 0 0 *



SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the operator of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.



DANGER

This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

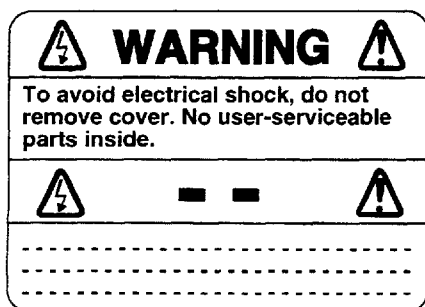


SAFETY INFORMATION FOR THE OPERATOR

WARNING	
	<p>Avoid opening cover of equipment except to replace paper, fuse or printing head.</p> <p>This equipment uses high voltage electricity which can shock.</p>
<p>Do not disassemble or modify the equipment.</p> <p>Fire, electrical shock or serious injury can result.</p>	
<p>Immediately turn off the power at the ship's mains switchboard if water or foreign object falls into the equipment or the equipment is emitting smoke or fire.</p> <p>Continued use of the equipment can cause fire, electrical shock or serious injury.</p>	

CAUTION	
<p>Do not place liquid-filled containers on the top of the equipment.</p> <p>Fire or electrical shock can result if a liquid spills into the equipment.</p>	
<p>Do not place heater near the equipment.</p> <p>Heat can melt the power cord, which can result in fire or electrical shock.</p>	
<p>Do not operate the unit with wet hands.</p> <p>Electrical shock can result.</p>	
<p>Use the correct fuse.</p> <p>Use of the wrong fuse can cause fire or equipment damage.</p>	
	<p>Do not touch printing head just after printing.</p> <p>Burn can result.</p>

WARNING Label attached



Name : Warning Label (1)
 Type : 86-003-1011-0
 Code No. : 100-236-230

FEATURES

The FAX-215 Facsimile Receiver has a wide variety of functions, all contained in a rugged metal case that is compact to fit almost any class of vessel.

All keys respond immediately to the operator's command and each time a control key is pressed an audible "beep" sounds to confirm that the command has been accepted by the unit.

Some of its prominent features are as follows.

- Parallel thermal head recording enables very quiet operation. Odors, fumes, carbon dust, electric noise, etc. are eliminated.
- Thermal paper (150m long) provides a clear-cut, high-quality picture in eight tones. Cloud analysis picture in the FM mode is presented clearly.
- Programmed with all existing facsimile stations and frequencies, which may be updated by the user. 310 private frequency spaces are reserved additionally for the user.
- Fully automatic reception by the built-in on/off/sleep schedule timer, auto speed/IOC selection, auto phase alignment and intelligent optimum frequency selection facility.
- Menu-driven/dialogue-guided operation enables sophisticated function with simple key sequences ... the highest user-friendliness.
- Battery back-up for real-time clock, schedule, channel/frequencies and all user presets.
- Various self-tests available for easy service and maintenance.
- Optional preamp unit available for vessels with limited antenna mounting space, providing stable signal on LF and HF bands with minimum onboard noise.

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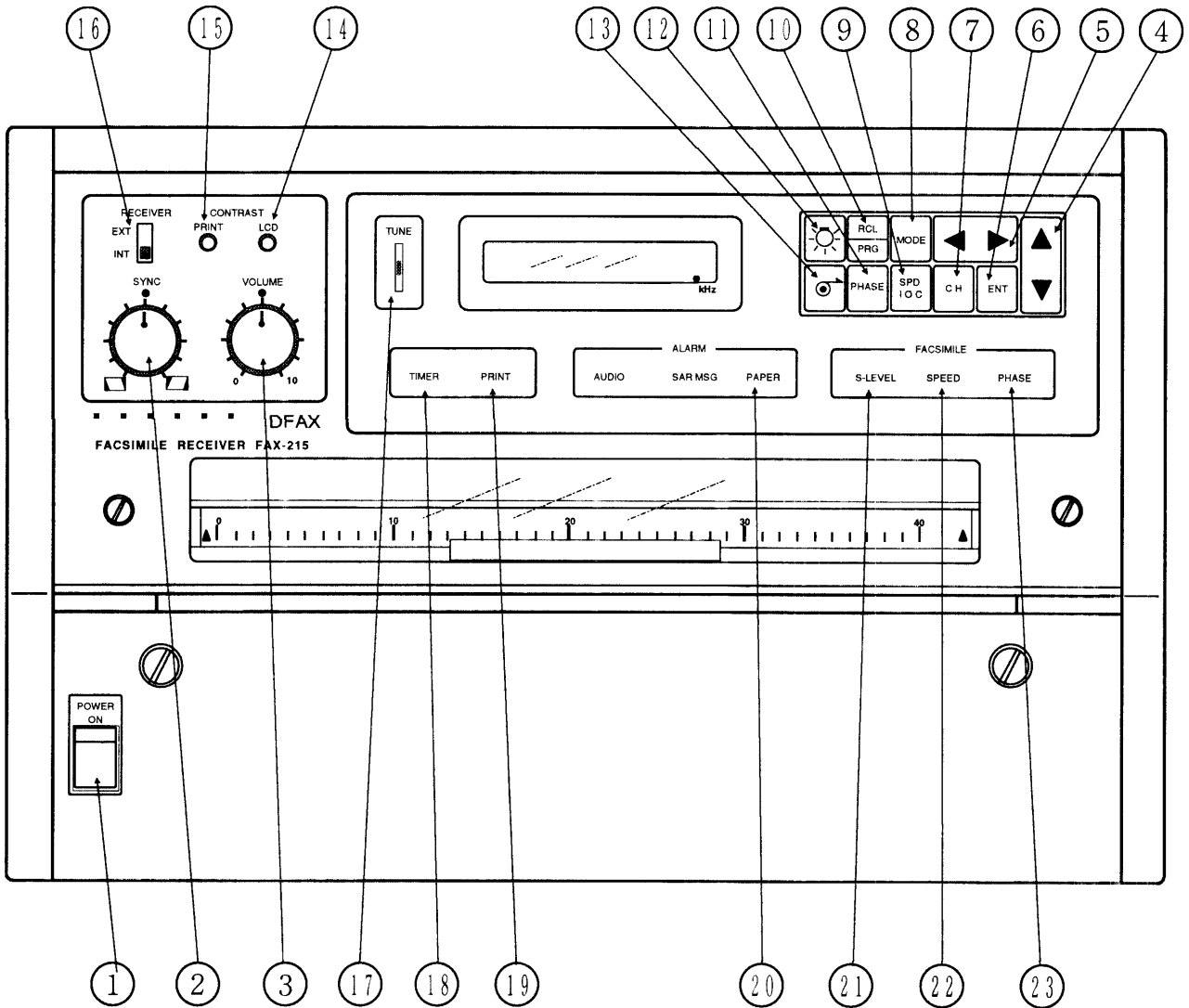
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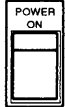


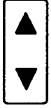












APPENDIX 2 USER FREQUENCY LISTS	AP2-1
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1. CONTROLS

1.1 Control Description



FAX-215 FRONT PANEL CONTROL & LED

No.	CONTROLS AND KEYS	No.	ANNUNCIATOR LEDs
①	 Turns on and off the unit.	⑰	TUNE The top, middle or bottom LED lights when Rx freq. is higher, the same, or lower than programmed freq., respectively.
②	 Fine tunes picture synchronization.	⑱	TIMER Lights when timer recording is on.
③	 Adjusts audio level of the monitor speaker.	⑲	PRINT Lights when printing.
④	 Change menu and setting data.		
⑤	 Shift the cursor leftward and rightward	⑳	PAPER OUT Lights when there is no recording paper.
⑥	 Registers data.	㉑	S-LEVEL Lights when signal level is low.
⑦	 Selects receiving channel.		
⑧	 Used to start/stop manual reception and turn the timer/ sleep on.	㉒	SPEED Lights when the scanning speed is incorrectly set.
⑨	 Adjusts scanning speed an IOC to match those of transmitter.	㉓	PHASE Lights when picture is out of phase.
⑩	 Displays data; programs the unit.		
⑪	 Adjusts picture phase.		* AUDIO and SAR MSG lamps are not operating.
⑫	 Turns on/off illumination.		
⑬	 Feeds paper.		
⑭	 Adjusts LCD contrast.		
⑮	 Adjusts recording intensity.		
⑯	 Selects internal or external receiver.		

1.2 [MODE] and [RCL/PRG] Keys

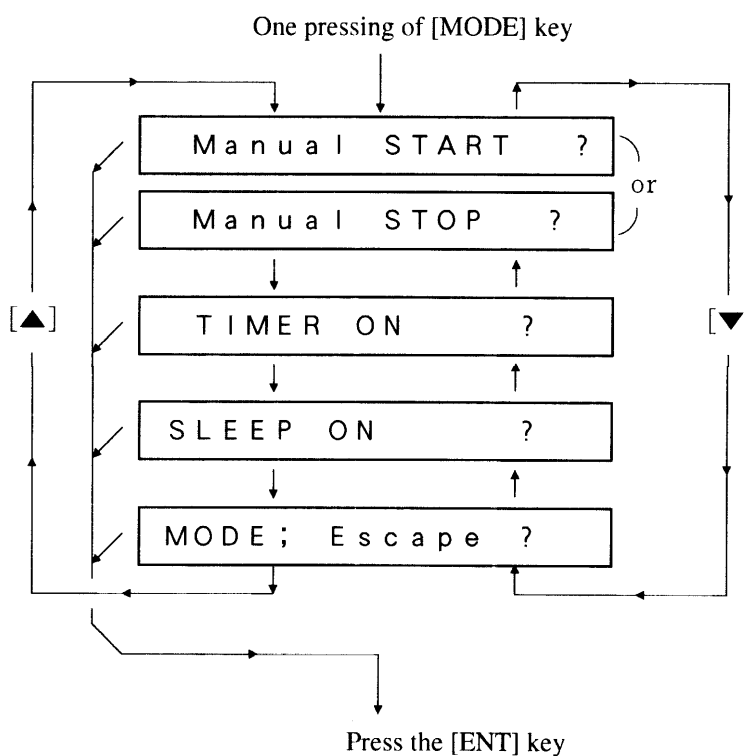
Function

The [MODE] key is used to operating of the printer in the manual recording mode, or to activate the timer/sleep modes. And the [RCL/PRG] key displays or changes time and various data.

NOTE: If you accidentally press the [MODE] key or the [RCL/PRG] key, you can return to the normal display by pressing [▲] and [▼] keys to display "Escape?" and then press the [ENT] key.

The [MODE] key

The [MODE] key and the [▲] and [▼] keys perform the functions shown in the figure which follows.

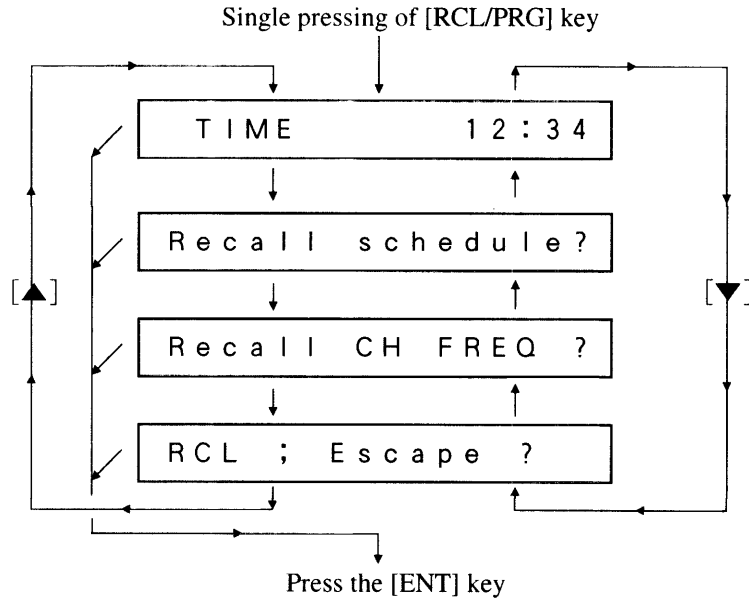


Ex. To select the function "TIMER ON" in the mode menu.

1. Press the [MODE] key.
2. Then press either the [▲] or [▼] key until message "TIMER ON " appears on the LCD display.
3. Press the [ENT] key.

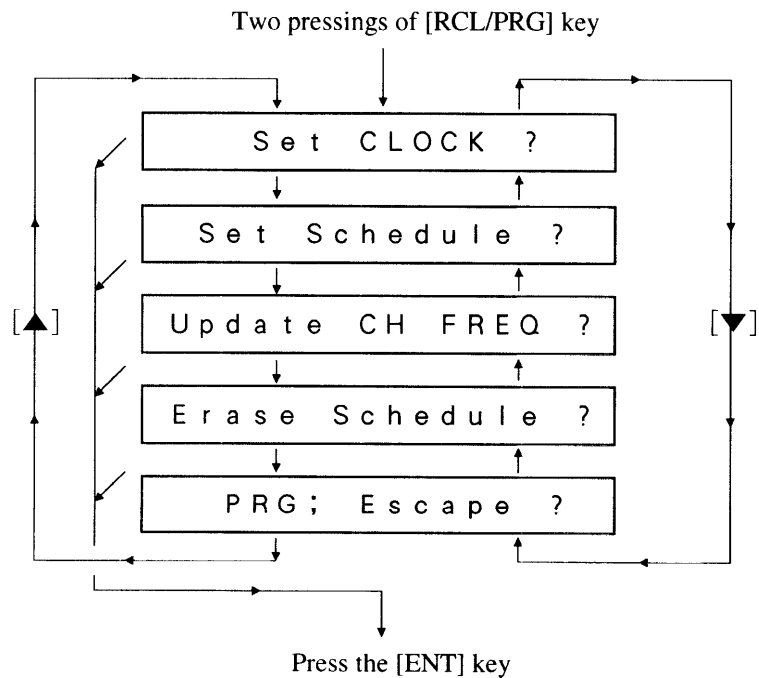
Single pressing of the [RCL/PRG] key

A single pressing of the [RCL/PRG] key enables confirmation of time and timer programs. You may select the item to confirm by operating the [▲] and [▼] keys. Then press the [ENT] key.



Two pressings of the [RCL/PRG] key

Two pressings of the [RCL/PRG] key enable change of time and timer programs. You can select what to change by operating the [▲] and [▼] keys. Then press the [ENT] key.



2. AUTOMATIC RECORDING

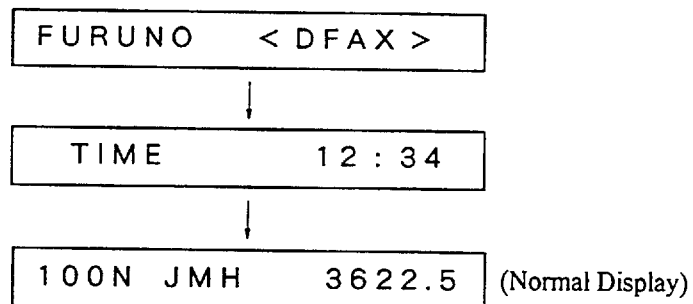
2.1 Automatic Recording


General

Once you set the facsimile station from which to receive, the unit goes into stand-by, ready to receive facsimile broadcast automatically upon reception of remote signal from the facsimile station. The procedure which follows shows how to ready the unit for automatic reception. You may also receive facsimile broadcasts automatically by the timer program feature. The instructions for how to do this are in "2.3 Timer Recording."

Getting into stand-by

1. Press the POWER switch to turn on the power. The display changes in the sequence shown below (your display makes look a little different), taking about five seconds to complete the sequence. The last-used station and frequency appear on the display.

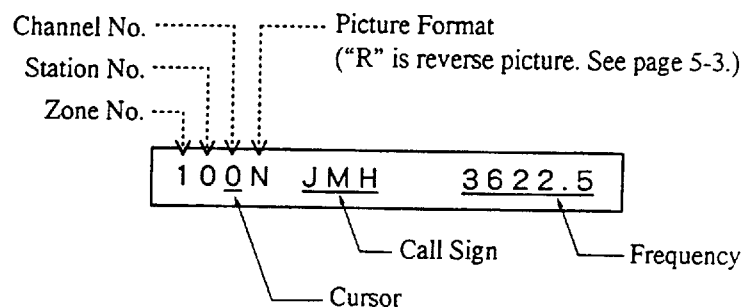


2. Adjust LCD contrast and illumination by the CONTRAST-LCD control and the [].

Selecting station

3. Referring to the facsimile station list at the end of this manual, select zone number and station no., and set them as follows. In the example shown below, station JMJ (Tokyo, Japan) zone 1, station 1 and channel no. 2 are temporarily set.

- 1) Press the [CH] key. The (blinking) cursor should be under channel number.



- 2) Press the [◀] key to set the cursor under zone number. Set zone by operating the [▲] and [▼] keys.
- 3) Press the [▶] key once to place the cursor under station number. Set station number by operating the [▲] and [▼] keys.
- 4) Press the [▶] key once to place the cursor under channel number. Set channel number by operating the [▲] and [▼] keys.

1 1 2 N	J M J	9 4 3 8 . 0
---------	-------	-------------

- 5) Press the [ENT] key. Station call sign, channel frequency and other information set in steps 2, 3 and 4 appear on the display.

1 1 2 N	J M J	9 4 3 8 . 0
---------	-------	-------------

Receiving and printing

The unit is now ready to receive. When it receives the start signal from the facsimile station, it automatically adjusts itself to match speed, IOC and phase of the transmitter and then saves picture information to the memory. ("PRINT" LED lights.) When a certain amount of picture information is accumulated, printing starts. Upon completion of the broadcast, the facsimile station sends the stop signal.

Stopping printing manually

Press the [MODE] key and the display will indicate the message "MANUAL STOP ?" for verification. Press the [ENT] key. **DO NOT STOP PRINTING BY TURNING OFF THE POWER, TO PREVENT DAMAGE TO THE PRINTING HEAD.**

2.2 Stopping Printing

General

In the “timer sleep” mode, the printer stops printing at the time preset by the operator.

Setting stop time

1. Press the [MODE] key, then scroll the menu with the [▲] or [▼] key to display the message “SLEEP ON ?”

SLEEP ON ?

2. Press the [ENT] key.

OFF at _ :

3. Press the [▲] key to change the display alternately as shown below.

OFF at _ 0:00 ← [▲] → OFF at * :

Entering stop time

4. Select the display “OFF at _0:00,” then press the [▶] key to move the cursor on the stop time column.

OFF at 0:00

5. Enter the desired stop time by the arrow keys.

OFF at 12:34

6. Press the [ENT] key.

OFF at 12:34

Stop printing by “stop signal”

4. Select the display “OFF at _” in step 3 above.

OFF at *

5. Press the [ENT].

OFF Facsimile

Stop printing in sleep mode

1. Press the [Mode] key. Operate the [▼] or [▲] keys to display the following message.

SLEEP ON ?

2. Press the [ENT] key.

OFF at _ :

3. Press the [ENT] key.

OFF Facsimile

Reprinting

1. Press the [MODE] key

OFF Facsimile



100N JMH 3622.5 (Normal display)

2.3 Timer Recording

General

Most LF/HF facsimile stations transmit facsimiles in accordance with a schedule issued by relative meteorological observatory. (You can find facsimile schedules in the publication "Meteorological Facsimile Broadcasts," available through meteorological observatory bodies.) If you wish to receive a certain facsimile broadcast on a daily basis, therefore, the timer recording mode will virtually allow you "hands-off" automatic operation. You may preset 50 timer programs.

Preparation

Before you start entering program times into the unit, you should prepare a list of stations and start/stop times. (A log for such is provided at the end of this manual.)

Adjusting recording

If the picture looks strange, you can adjust (while printing) the frequency, speed, IOC and phase to correct it.

Procedure

1. Press the [RCL/PRG] key twice. Operate the [▲] and [▼] keys to display the following message.

S e t S c h e d u l e ?

2. Press the [ENT] key. The following display appears.

0 0 0 N P R V * * 0 : 0 0

Cursor →

└─ Zone, Station, Channel ─┘ └─ Broadcast Start Time ─┘

In the procedure which follows you are shown how to set Tokyo, Japan station JMH, zone number 1, station number 0, and broadcast start and stop times of 15:29 and 15:47.

Set station

3. Set "1," "0" and "*" as zone number, station number and channel by operating the [▲] and [▼] keys to shift cursor and the [▲] and [▼] keys to set data.

1 0 * J M H * * 0 : 0 0

Zone No. → Station No. → Frequency Scanning → Start Signal →

(* means automatic selection of best frequency.)

Speed (* : Remote Signal
a: 60 rpm
b: 90 rpm
c: 120 rpm
d: 240 rpm) (* : Automatic (Remote) Start
s: Timer Start (IOC=576) slow
f: Timer Start (IOC=288) fast)

Select speed and start signal

4. Set “*,” “*” as the speed and start signal by the arrow keys.

Set recording start and stop times

5. Press the [▶] key to set the cursor on the hour in the starting time column. Press the [▲] and [▼] keys to set starting time, using 24-hour notation. (In the example the starting time hour is 15.) You may press and hold down on those keys to speed up the rate of change. Similarly set the starting minute. Enter a time at least two minutes earlier than actual start time to allow for detection of the start signal.

```
10 * N JMH  * * 15 : 27
```

6. Press the [▶] key to set the cursor on the stop recording time column.

```
* * 15 : 27  →  0 : 00 Y
```

Start Time

Stop Time

7. Set stop time by operating the arrow keys. Enter a time at least two minutes later than actual stop time to allow for detection of stop signal.

```
* * 15 : 27  →  15 : 50 Y
```

Setting timer program ON/OFF

You can turn on or off the timer programs: “Y”(Yes) for on, “N” for off.

8. After selecting “Y” or “N” by the arrow keys, press the [ENT] key. This concludes the procedure for entering timer program.

To enter another timer program, repeat the procedure.

NOTE: *If, when you open the timer program menu, 50 timer programs already exist, the message “Schedule full” momentarily appears and then control is returned to the normal display. You cannot write over existing programs, however you can erase them individually or collectively. More on this later.*

```
Schedule Full !
```



```
100N JMH 3622.5
```

(Normal Display)

You can confirm timer programs by printing the timer program list. For further details, see page 2-10.

Starting timer operation

Press the [MODE] key. Select the message "TIMER ON," then press the [ENT] key. ("TIMER" LED lights.) If no timer programs are programmed, the message "No Schedule!" will be displayed.

Canceling timer operation

Press the [MODE] key. ("TIMER" LED goes off.)

Remarks on timer recording

- If you set two programs which overlap each other in time, the program having the later starting time is not recorded. For example, program A's start and stop times are 2:00 and 2:30 and program B's, 2:15 and 2:40. In this instance program B will not be recorded.
- When the start signal detection method is "automatic start," the receiver scans a facsimile station's transmit frequencies to find the most suitable one. If there is no signal or a suitable frequency cannot be found, the picture is not printed.
- You may change receive frequency during printing, when picture quality is not satisfactory.
- Use of the scanning function is not recommended when phasing or other factor varies greatly by signal strength. Instead, set the channel (frequency) you feel is most suitable.
- For the automatic start mode, the start and stop times should be set at least one minute earlier and later than scheduled times to allow for complete acquisition of the start and stop signals.

Two methods of timer recording

There are two methods by which timer recording can be started: automatic start and timer start.

In automatic start, the unit is in stand-by at the program start time, and records the picture when it receives the "start signal" from a facsimile station. The IOC number is automatically chosen by the unit.

In the timer start mode, the unit operates by programmed timer schedule regardless of the presence or absence of a facsimile signal. However, the proper IOC (576 or 288) must be chosen by the operator.

Because of the inconvenience of having to choose IOC, it is recommended to select automatic start rather timer start to ensure reception of the entire picture.

Changing timer programs

Follow the procedure below to change timer programs.

1. Press the [RCL/PRG] key once. Press the [▲] and [▼] keys to display the following.

```
R e c a l l   S c h e d u l e ?
```

2. Press the [ENT] key. The start time nearest to current time appears. Press the [▲] and [▼] keys to display the program you want to change; [▲] for earlier program, [▼] for later one.

```
5 2 *   K W A F   * * 1 7 : 2 6
```

 (Timer Program)

3. Press the [RCL/PRG] key again to get into the timer program mode. Change program times as necessary by pressing the arrow keys.

```
5 2 *   K W A F   * * 1 7 : 2 6
```

4. Press the [ENT] key. The normal display appears.

```
S E T
```



```
1 0 0 N   J M H   3 6 2 2 . 5
```

 (Normal Display)

Erasing timer programs

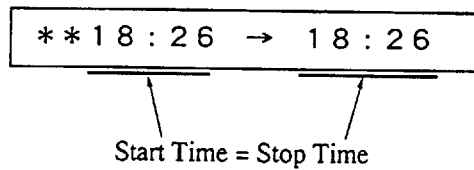
You may erase all or specific timer programs as follows.

Specific programs

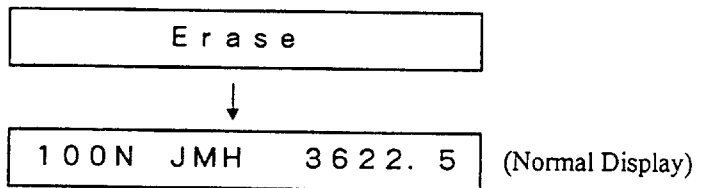
1. Follow steps 1 through 3 in “Changing timer programs” to display the timer program you want to erase.

```
5 2 *   K W A F   * * 1 7 : 2 6
```

2. Press the [▶] key to set the cursor on the starting time column. Change the starting time to same time as stop time by the arrow keys.

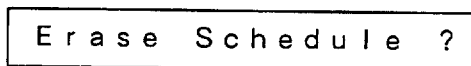


3. Press the [ENT] key. The display changes in the following sequence.

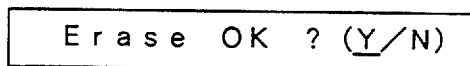


All programs

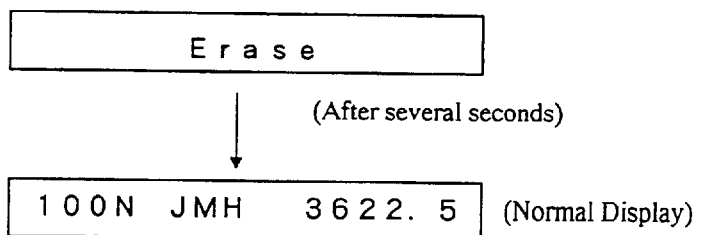
1. Press the [RCL/PRG] key twice. Press the [▲] and [▼] keys to show the following display.



2. Press the [ENT] key. The following display appears.



3. Press the [ENT] key to erase all programs, or escape by selecting "N" (NO) followed by the [ENT] key.



Printing timer program list

The timer program list contains all timer programs, arranged in chronological order. You can print a hard copy of it for reference.

1. Turn off the power. While pressing and holding down the [RCL/PRG] key, turn on the power. Release the [RCL/PRG] key when a display appears.
2. Press the [▼] key to show the following display.

```
Print Schedule ?
```

3. Press the [ENT] key to print the timer program list.

```
Print Schedule
```

The figure below shows a sample timer program list. Check your list for correctness.

Picture Format	Frequency	Start Time	Stop Time
	***	Schedule	***
111N JMJ	54050	cS 7 : 28	- 7 : 42Y
103N JMH	99700	aS 8 : 01	- 8 : 12N
100N JMH	36225	bF 8 : 20	- 8 : 30Y
100N JMH	36225	*(*) 9 : 15	- 9 : 36N
11(*) JMJ		bS 11 : 13	- 11 : 30Y

Frequency is not printed when scannig mode is selected.

This shows automatic start. cS means speed of 120rpm and IOC of 576.

Timer program isn't carried out.

4. After the list is completely printed, turn the power off.

```
END
```

3. MANUAL RECORDING

3.1 How to Record Manually

Preparation

To receive a facsimile signal manually, you will first need to set zone number, station number and channel number. These are listed in the facsimile station list in Appendix 1. The list does not show frequencies (since they are usually not necessary for operation). You may, however, print a hard copy of all frequencies (including ones you entered) stored in this unit. For further details, see page 5-5.

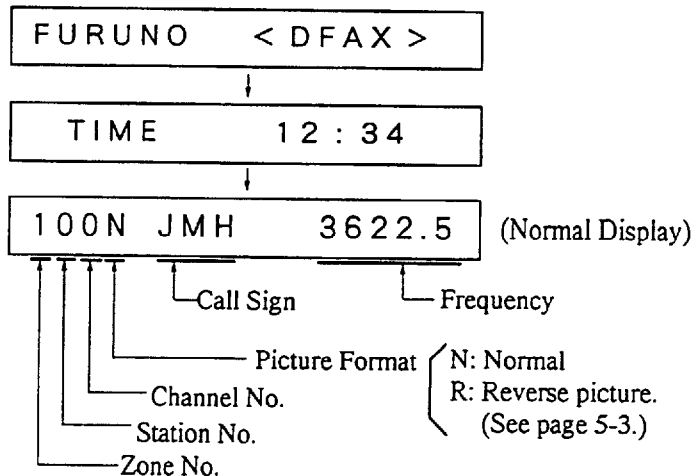
NOTE: Do not turn off the power while printing, to prevent damage to the printing head.

The procedure which follows includes how to manually receive automatic recording broadcast which has already started and how to receive from a facsimile station which does not use start and stop signals.

Procedure

Turning on the power

1. Press the POWER switch. The display changes in the sequence shown below, the entire sequence taking about five seconds. The last-used station and frequency appear.



Adjusting illumination

2. Press the [☀] key to adjust LCD and LED illumination to “bright,” “dim” or “off.” Then, adjust LCD contrast by the CONTRAST-LCD control.
3. Select internal receiver by the RECEIVER switch. Set the RECEIVER switch to “INT” (Internal receiver).

Selecting station

4. Select facsimile station (zone and station) as follows.
 - 1) Press the [CH] key. The cursor should be under channel number.

1 0 0 N	J M H	3 6 2 2 . 5
---------	-------	-------------

└─── Cursor

- 2) Press the [◀] key to place the cursor on zone number (far left side digit). Operate the [▲] and [▼] keys to set zone number.
- 3) Press the [▶] key once to place the cursor under station number. Operate the [▲] and [▼] keys to set station number.
- 4) Press the [▶] key to place the cursor under channel number. Press the [▲] key to display the asterisk (*), to get automatic frequency scanning. This is the preferred (and easiest) method of frequency selection, however you may wish to designate specific channel number.

1 0 * N	J M H
---------	-------

- 5) Press the [ENT] key. The unit scans the frequencies of the facsimile station selected.

1 0 * N	J M H	S C A N
---------	-------	---------

- 6) The frequency found through scanning appears on the display.

10 * N JMH 7305.0

"S-LEVEL" LED lights when signal level is low.
If you cannot receive by scanning, select a suitable frequency.

5. You can monitor the facsimile signal through the speaker. Adjust the volume of the speaker by the VOLUME control, if necessary.

Changing SPD/IOC

6. You may have to change the SPD (speed) and IOC (Index of Cooperation) depending on the facsimile station. SPD and IOC of the receiver must match those of the transmitting station to reproduce an exact copy of the picture. You can find SPD and IOC of all facsimile stations in the publication "Meteorological Facsimile Broadcasts."

- 1) Press the [MODE] key.

Manual START ?

- 2) Press the [ENT] key.

SPD / IOC 60 / 576

Speed { • 60
• 90
• 120
• 240 } IOC { • 288 (Low)
• 576 (High) }

- 3) Press the [▲] and [▼] keys to set speed.
4) Press the [▶] key to place the cursor in the far right-hand column. Operate the [▲] and [▼] keys to set IOC.
5) Press the [ENT] key.

10 * N JMH 7305.0 (Normal Display)

**Adjusting
intensity of
recording**

Turn the PRINT control for an optimum recording intensity.

**Stopping the
printer****By stop signal (automatic)**

7. Most facsimile stations transmit the stop signal at the end of a broadcast to stop printing automatically.

Manually

If the facsimile station does not transmit the stop signal, or you want to stop printing yourself, do the following.

1) Press the [MODE] key.

M a n u a l S T O P ?

2) Press the [ENT] key.

1 0 * N J M H 7 3 0 5 . 0

 (Normal Display)

8. Press the [⊙[→]] key to feed the recording paper. Tear off the recording.

3.2 When the Recording is Abnormal...

This section provides the information necessary for adjustment of the recording.

Wrong SPD/IOC setting

Wrong SPD causes overlapped picture or multiple pictures. Incorrect IOC expands (or shrinks) the picture vertically. Find the correct SPD and IOC numbers, and set them as shown in the following procedure.

- 1) Press the [SPD/IOC] key.

SPD / IOC 120 / 576

- 2) Operate the arrow keys to set both SPD and IOC.
- 3) Press the [ENT] key to register settings and return to the normal display.

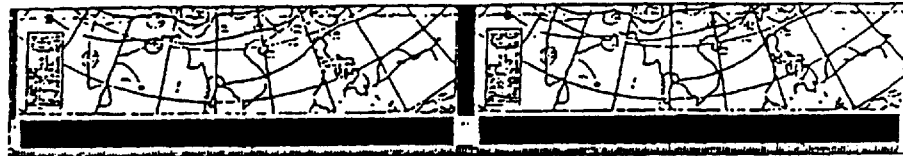
10 * N JMH 7305.0

NOTE: The [SPD/IOC] key is operative only while printing.

Examples of recordings with wrong settings of SPD and IOC

What happens to picture when SPD or IOC is wrong

- * Multiple pictures...Speed lower than correct speed.



- * Overlapped picture...Speed higher than correct speed.

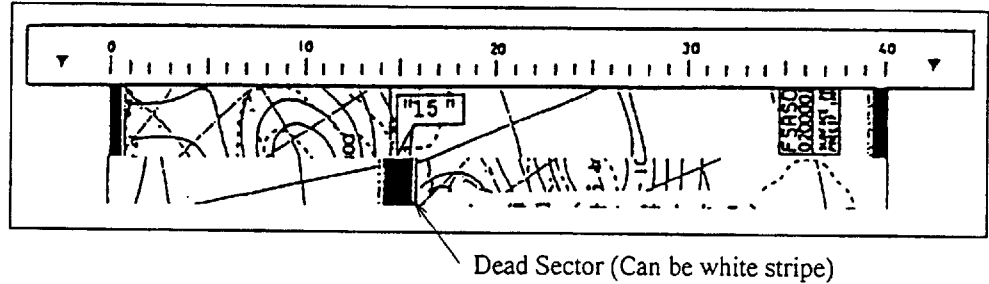


- * Enlarged picture...IOC 576 signal but IOC 288 set on FAX-215
Shrunk picture: IOC 288 signal but IOC 576 signal set on FAX-215.



Phase mismatch

When the FAX-215 starts receiving a broadcast already in progress, or noise prevents detection of the phasing signal, the recording may be divided into two parts by a thick black (or white) stripe called a dead sector. This phenomenon is due to phase mismatching. When this occurs, use the [PHASE] key to shift the dead sector to the left edge of the recording paper.



- 1) Press the [PHASE] key. The following display appears.

```
S e t   P H A S E ; 0 0
```

- 2) Read the scale to find the center of the dead sector. Enter it by operating the [▲] and [▼] keys. For example, in the figure shown above the dead sector is centered at "15" on the scale. The setting range is 00 and 40.

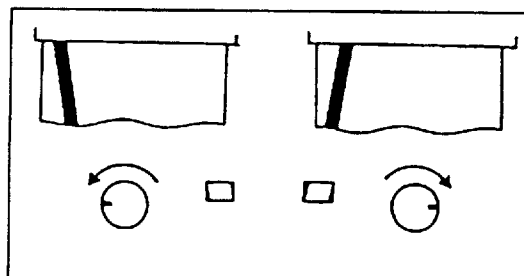
```
S e t   P H A S E ; 1 5
```

- 3) Press the [ENT] key. The dead sector shifts to the left edge of the recording paper.

Note that the [PHASE] key also is operative only while printing.

Phasing signal out of synchronization

The SYNC control functions to fine tune of the phasing signal. If the dead sector is plotted at an angle even when the PHASE is properly selected, turn the SYNC control in an appropriate direction to print the dead sector straightly.



Tuning

There are rare occurrences, where the actual receiving frequency slightly deviates from the nominal transmitting frequency. The TUNE indicator, composed of three lamps will “flow” upward when the receiving frequency is lower than the preprogrammed frequency data. Press and hold the [▲] key until the indicator stops flowing and only the center lamp lights stably. On the contrary, press the [▼] key if the indicator flows downward.

Note1. The TUNING is inoperative when selecting the scanning mode.

Note2. The indicator will always flow for a signal in LF band or for a picture of which the most part is occupied by the black signal, irrespective of frequency deviation.

3.3 Selection of Receive Frequency

General

A facsimile station will usually transmit a facsimile picture over several different frequencies (on the HF band). This allows the receiving station to select the most suitable frequency channel, to obtain a quality recording.

The general rule for selection of frequency is to select the highest useable frequency band first, and then switch to the next lower useable frequency band if the picture is not reproduced satisfactorily.

Further, other factors such as the distance to the transmitting station, receiving time, season, and year should be taken into consideration when selecting a frequency.

Scanning

The FAX-215 eliminates the inconvenience of manual frequency selection by using a scanning receiver to do the job automatically. The receiver scans the frequencies of a facsimile station and locks onto the frequency of which the signal strength is the highest. It scans by the following rules:

- If the signal level of two or more channels is the same, the highest frequency is selected.
- It always picks up an LF channel (80 kHz to 160 kHz) above a certain level, regardless of whether signal is stronger on other channel(s).
- It recommences scanning if the signal level stays below a certain level. (It is possible to inhibit scanning while printing by internal DIP switch. Refer to page 5-6.)

NOTE: *Another method for selection of frequency is to monitor signal strength through the built-in speaker. The clearer the signal, the higher the strength.*

When automatic scanning does not work...

The automatic scanning function may not work when, for example, the signal is too weak. In this case designate a channel instead of using automatic scanning.

3.4 Reception by External Receiver

General

The unit requires no external receiver for normal use because most of the LF and HF weather facsimile broadcast frequencies are programmed in the memory. Under very critical signal conditions, however, the FAX-215 may be operated by using AF signal from a high sensitivity external receiver. (Even if you use the external receiver, timer recording is available.)

Procedure

1. Connect the AF output of the external receiver to the EXT SIG terminal on the unit. Generally the optimum level of AF signal (1mW/600ohms) may probably be taken out from LINE OUT of the receiver. Adjustment of the AF signal level is very important. If the level is insufficient (less than 0.1mW) the unit will not operate, if it is too high (more the 10mW) the recorder circuitry may be damaged. In practice, it is essential to tune the receiver in the desired station, and then gradually increase the AF output to the rated level.
2. Set the MODE and BANDWIDTH selectors of the receiver to "CW" and "NARROW (approx. 1kHz)". Turn the RF GAIN control fully clockwise and set the AGC switch to "OFF". Place the BFO control at the mid point of its travel and set the receiver to the desired frequency. Adjust the VOLUME and BFO controls for a clear facsimile signal.

Note: To receive an ISB station, it may be necessary to shift the frequency within $\pm 2\text{kHz}$ relative to the assigned frequency.
3. Set the RECEIVER switch to the "EXT" position.
4. Apply the power to the FAX-215. The message "999N" is displayed on the LCD Display. (The "N" denotes the picture mode is Normal. If the transmitting station transmits facsimile signal with reversed spectrum, change "N" into "R". For further details, see page 5-3.)
5. Get the message "SPD/IOC xx/xx" on the display window by pressing the [MODE] key followed by the [ENT] key, and set the proper SPEED and IOC number referring to the Facsimile Schedule Book.

6. On completion of the SPD/IOC settings, press the [ENT] key to activate recording. Gradually increase the AF signal level so that the picture is plotted on the recording paper. If necessary, readjust the BFO control for a clear recording.
7. When interference or noise is heavy, try to shift the TUNING dial within 300Hz of the assigned frequency to obtain a better picture. A narrower bandwidth is better for rejecting noise. However if the resolution of picture becomes poor, select a wider bandwidth.

4. REPLACEMENT OF RECORDING PAPER

General

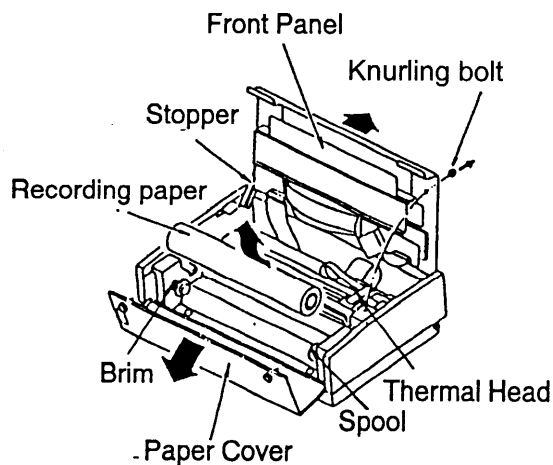
When about two meters of recording paper remains a red stripe starts appearing at the right edge of the recording paper. If this occurs during printing you can continue printing, however you should load a new roll as soon as printing is completed. When the paper runs out completely, a buzzer sounds, the "PAPER OUT" LED lights and the message "PAPER OUT" appears on the display.

Turn the power off and replace the paper as shown in the procedure below.

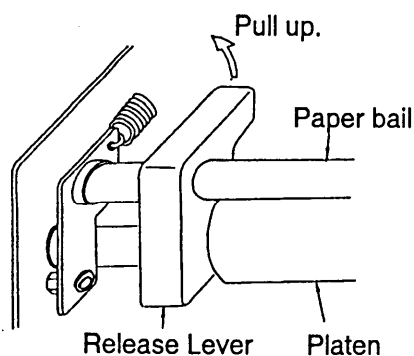
Name	Type	Code No.
Thermal paper	TP-15150 (150m long)	000-805-657

Procedure

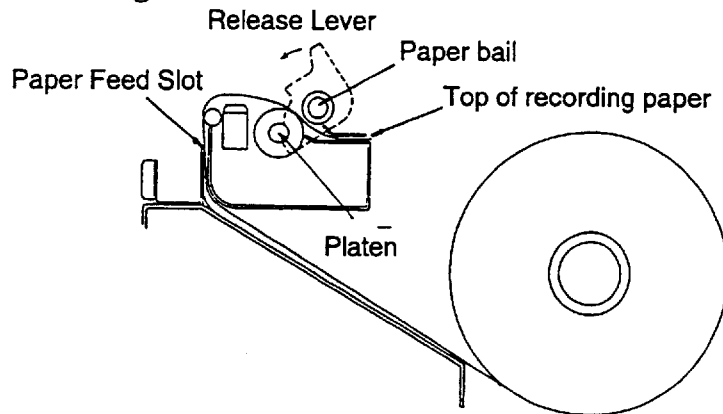
1. Loosen four screws securing the paper cover and front panel to open them. (Flip up the front panel until it is locked by the stopper.)



2. Move thermal head far right side, then loosen RELEASE lever by pulling it up to release lock of paper bail. Then rewind the remaining paper.



-
3. Take out the paper spool, pushing the spool catch leftward.
 4. Set new recording paper to paper container. Insert the top of the recording paper through the paper feed slot. Then pass it between paper bail and platen as shown in the figure below.



5. After checking that the paper is aligned evenly, lock the RELEASE lever.
6. Close the paper cover and front panel.
7. Turn the power on and press the [⊙] key to confirm that the paper is fed correctly. If the paper is slant, loose the RELEASE lever and set the paper correctly.

5. CHANGING FREQUENCIES AND SETTINGS

5.1 Setting the Built-in Clock

When to set the clock

The time of the built-in clock must be accurate for effective timer recording. You will need to set the time when the unit is first installed, when the time is wrong, or when the memory is cleared. The clock continues working by a battery when the unit is off.

Procedure

1. Press the [RCL/PRG] key twice.

```
Set CLOCK ?
```

2. Press the [ENT] key. The following display appears.

```
Set CLOCK 12 : 3 █
```

Cursor

3. Using the arrow keys, set UTC time in 24-hour notation. Press the [ENT] key at the exact moment the time signal sounds for the start of a new minute or hour.

```
Set CLOCK 12 : 40
```

(Cursor disappears.)

↓

```
10 * N JMH 7305.0
```

(Normal Display)

5.2 Changing Frequencies

General

The FAX-215's memory contains all frequencies for existing facsimile stations. However, if the transmit frequency of a station changes, change frequency data as shown in the procedure below.

Procedure

For example, the Tokyo, Japan station JMH (zone no. 1, station no. 0) will change the frequency of channel number 4 from 13597.0 kHz to 13582.0 kHz.

1. Press the [RCL/PRG] key twice. Press the [▲] and [▼] keys to show the following display.

```
Up date CH  FREQ  ?
```

2. Press the [ENT] key. The following display appears.

```
00N PRV 799
```

3. Using the arrow keys, set zone number as "1," station no. as "0," and channel no. as "4." If the station transmits the facsimile picture in white characters on black background, change "N" to "R." (See next page.)

```
104N JMH 13597. █
```

4. Place the cursor in the frequency column. Press the [▲] and [▼] keys to change the frequency from 13597.0 to 13582.0.

```
104N JMH 13582. █
```

5. Confirm the data and then press the [ENT] key to register it and return to the normal display.

```
S E T
```



```
100N JMH 13582. 0 (Normal Display)
```

Reverse picture

The usual facsimile picture format has black text on white background. Some stations, however, print white characters on black background. This information is programmed into the memory, thus you need not designate picture format when receiving a facsimile. However, if you are entering frequency data of a newly established station whose picture format is reverse, designate "R" (instead of "N") to print the picture in the usual format.

5.3 Entering New Frequencies

General

The FAX-215 provides a free memory for storage of new channels (private channels). You can store up to 310 channels, in the zone numbers 0 to 8.

Zone No.	Station No.	Call Sign	Channel no. (Qty)	Zone No.	Station No.	Call Sign	Channel no. (Qty)
0	0	PRV	0 ~ 9 (10)	3	A	AUX	0 ~ 9 (10)
	1	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	2	PRV	0 ~ 9 (10)	4	A	AUX	0 ~ 9 (10)
	3	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	4	PRV	0 ~ 9 (10)	5	A	AUX	0 ~ 9 (10)
	5	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	6	PRV	0 ~ 9 (10)	6	9	AUX	0 ~ 9 (10)
	7	PRV	0 ~ 9 (10)		A	AUX	0 ~ 9 (10)
	8	PRV	0 ~ 9 (10)	B	AUX	0 ~ 9 (10)	
	9	PRV	0 ~ 9 (10)	7	9	AUX	0 ~ 9 (10)
	A	PRV	0 ~ 9 (10)		A	AUX	0 ~ 9 (10)
	B	PRV	0 ~ 9 (10)	B	AUX	0 ~ 9 (10)	
1	B	AUX	0 ~ 9 (10)	8	9	AUX	0 ~ 9 (10)
2	9	AUX	0 ~ 9 (10)		A	AUX	0 ~ 9 (10)
	A	AUX	0 ~ 9 (10)	B	AUX	0 ~ 9 (10)	
	B	AUX	0 ~ 9 (10)				

You may enter facsimile station data in any zone. However, it is probably less confusing if you use zone "0" for new frequencies and enter other frequencies in corresponding zones. (Sorting by zone is especially important for efficient scanning.) The procedure for entering frequencies is the same as in "5.2 Changing Frequencies."

Recalling channel frequency list

1. Press the [RCL/PRG] key and operate the [▲] and [▼] keys to display the following message.

Recall CH FREQ ?

2. Press the [ENT] key. Then recall a channel frequency you wish to see by selecting zone, station and channel with the arrow keys.

Printing channel frequency list

You may wish to print a hard copy of all frequencies (both user entered and preprogrammed) stored in the unit.

1. Turn off the power. While pressing and holding down the [RCL/PRG] key, turn on the power. Release the [RCL/PRG] key when a display appears.
2. Press the [▲] and [▼] keys to display the following message.

Print CH FREQ ?

3. Press the [ENT] key to print.

Print CH FREQ

4. After the list is completely printed, turn the power off.

Channel Frequency									
----- Zone No. 0 -----									
Station - 0	PRV								
799	799	799	799	799	799	799	799	799	799
----- Zone No. 1 -----									
Station - 0	JMH								
36225	49020	73050	99700	135970	182200	235229			
Station - 1	JMJ								
33650	54050	94380	146925	184412					
Station - 2	JJC								
43160	84675	127455	169710	170696	225420	162700	238641		
Station - 3	JFA								
42740	64145	86580	130740	169075	224455				
Station - 4	3SD								
84600	128300	223380	169020						

E N D

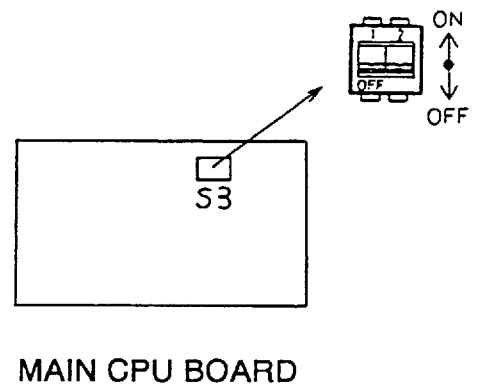
5.4 Changing Scanning Mode and Recording Intensity

General

FAX-215 has three DIP switches (S1/S2/S3) on the MAIN CPU board. S1 and S2 are only for a service technician. This chapter describes the S3 function.

S3 settings

DIP Switch	Function	
S3-1 (Scanning Mode)	OFF (Factory setting)	When received signal level becomes weak while printing, scanning is automatically started to search for best station
	ON	No scanning while printing.
S3-2 (Recording intensity)	OFF (factory setting)	Eight gradation
	ON	Two gradation



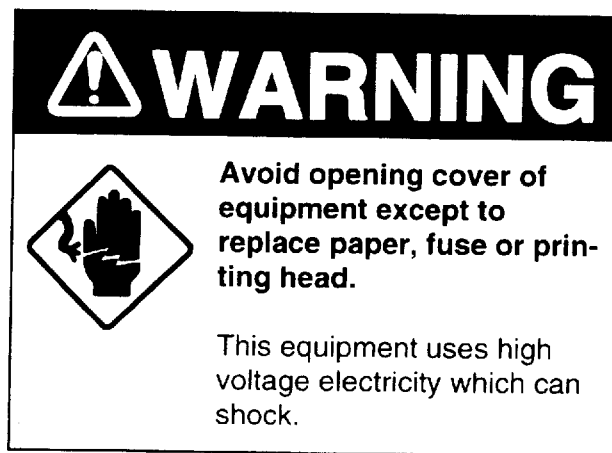
6. MAINTENANCE

6.1 Visual Checks and Cleaning

Visual checks

This unit is designed and manufactured to provide many years of trouble free performance. However, no machine can perform its intended function unless properly maintained.

The unit should be visually checked on a regular basis, following the check points shown in the table below.



Check Point	Action/Remedy
Whip antenna	Check for damage. Replace if necessary.
Antenna wire	Check sheath for cracks. Tape minor cracks. Replace the antenna if there are signs of water leakage.
Junction between 2.6 m whip antenna and preamp (option)	Check for corrosion and tight connection. Clean and waterproof with sealing compound, if necessary.
Coaxial cable	Check for damage and tight connection. Replace if damaged.
Power cable	Check for tight connection at battery and unit.
Ground terminal	Check for tight connection and corrosion. Remove rust.

Cleaning

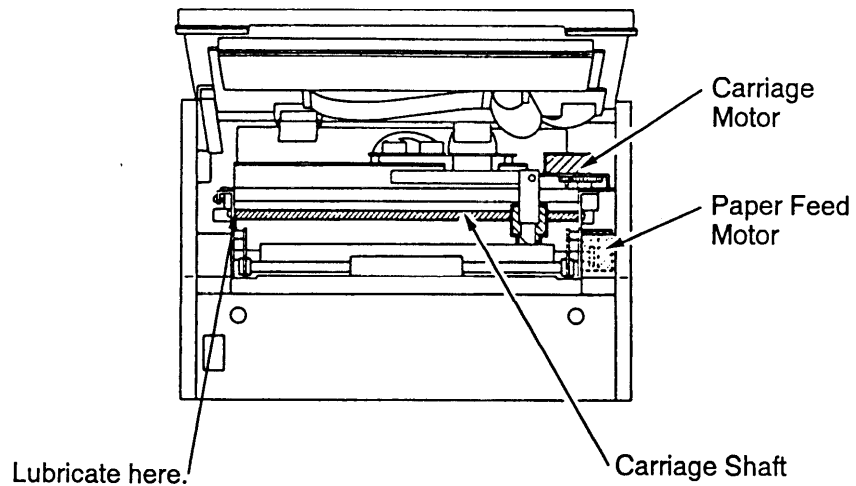
Keep the unit clean and dry at all times. Dust can be removed with a soft cloth. If necessary, the unit can be cleaned with a mild detergent diluted with fresh water. Chemical solvents such as thinner or acetone should never be used to clean the unit. They can remove paint and markings.

6.2 Cleaning of the Printing Head

When to clean the printing head

The printing head is capable of printing more than 6 rolls of paper. However, if dust is allowed to accumulate on the surface of the head, print quality will drop considerably. A head cleaner comes with the FAX-215. Clean the head with the head cleaner every one roll of paper as follows.

For recording pictures the carriage moves right and left on the shaft. Too heavy friction on these components can cause uneven recording or damage to the carriage motor. In every six months, wipe out the dirt on the carriage shaft and apply a drop of oil on it. At the same time apply 2-3 drops of oil on each reduction gear of the carriage motor and paper feed motor. Do not over lubricate. Use the oil and oil pot supplied as the accessories.



6.3 Replacement of Printing Head

General

The estimated life of the printing head is about 300,000 lines. If picture quality gets poor, and cannot be improved by cleaning the printing head or by adjusting the PRINT control, the printing head should be replaced.

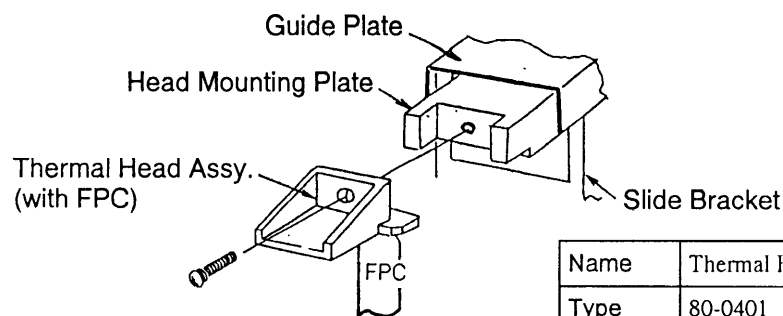


NOTE

- 1) Do not touch the printing surface of the head to permit good contact with the recording paper.
- 2) Perform the Self-test to check and evaluate the condition of the printing head. (See page 6-11.)
- 3) Ensure that no stress is applied to the film cable even when the head moves to the ends of the carriage shaft.
- 4) Do not hit or scratch the carriage shaft or platen plate. Deformation or dent on these components will result in poor recording quality or even cause permanent damage to the drive motor or recording mechanism.

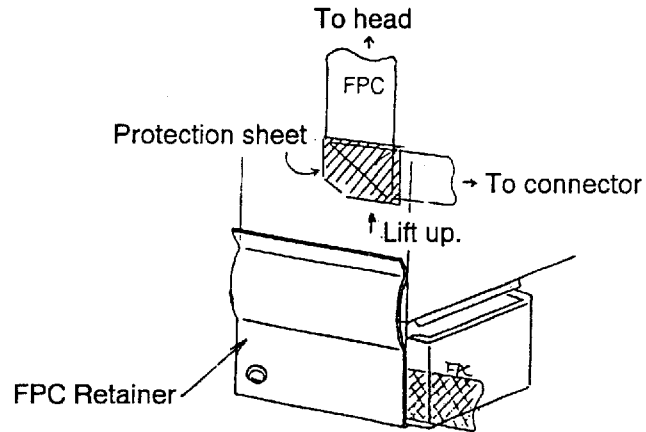
Procedure

1. Turn the power off and open the front panel. Loosen a screw securing thermal head assy. to head mounting plate.



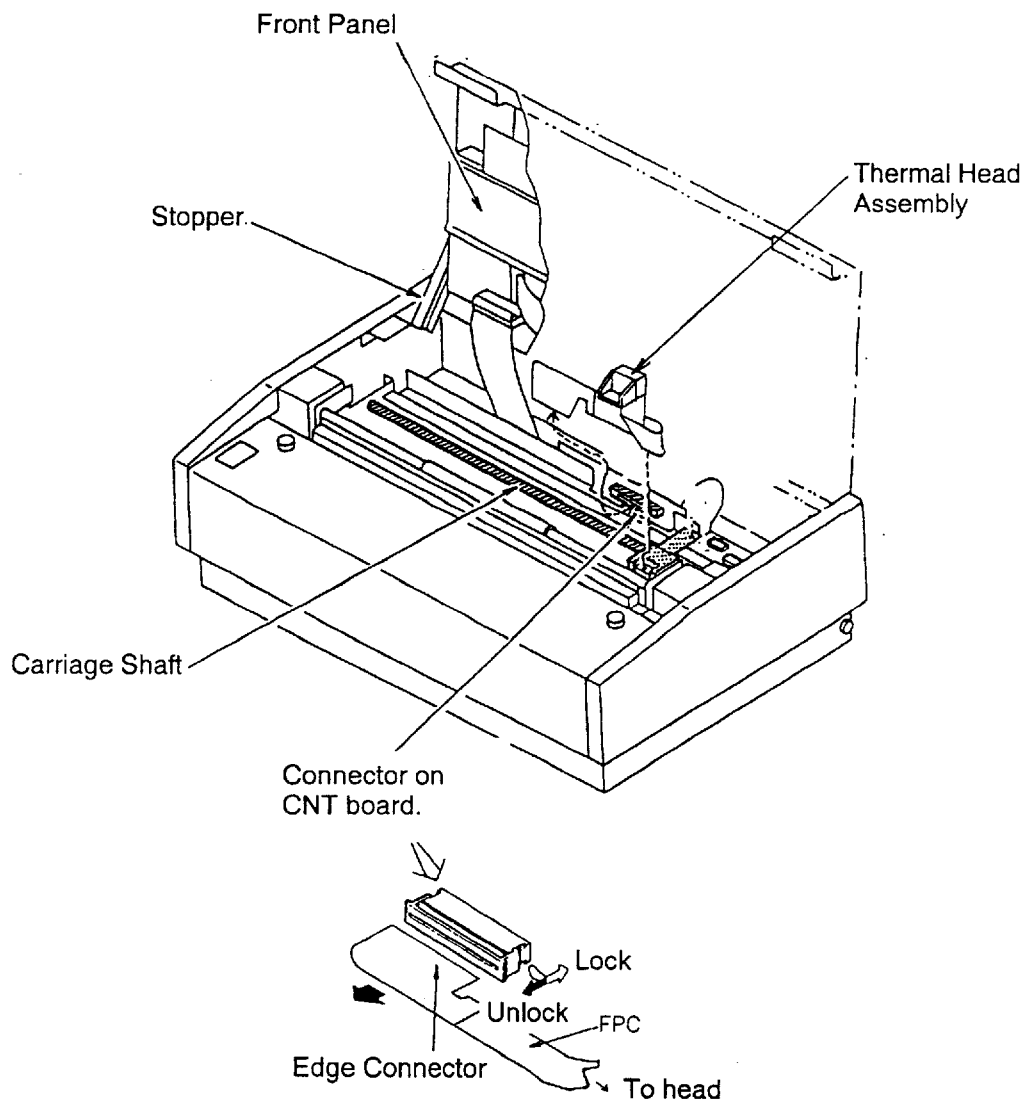
Name	Thermal Head Assembly
Type	80-0401
Code No.	007-536-360

2. Detach FPC from FPC retainer using tweezers.



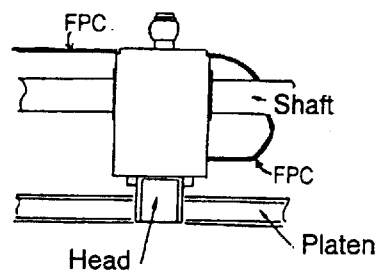
3. Loosen two screws on the top of guide plate and turn head mounting plate upward. Take care not to lose spring inserted between guide plate and head mounting plate.

4. Disconnect FPC edge connector from CNT board.



5. Lift up head assy. (with FPC) and remove it from printer mechanism.
6. Pass new thermal head assembly under carriage shaft as shown below and connect edge connector of FPC to connector of CNT board.

Ensure that head and angle are aligned properly. Never touch printing surface of head. If touched, wipe it with a soft cloth and a small amount of isopropyl alcohol. Also do not pull film cable since it is connected to printer head only with glue.



Head Front View

7. Put the other side of thermal head assembly in front of the head mounting plate. Then insert protection sheet into FPC retainer securely. Confirm that there is no slack between FPC retainer and head.
8. Insert spring removed in step 3 between guide plate and head mounting plate.
9. Fix head to head mounting plate tightly.
10. Close front panel.
11. Carry out selftest to check printing condition, referring to page 6-11.

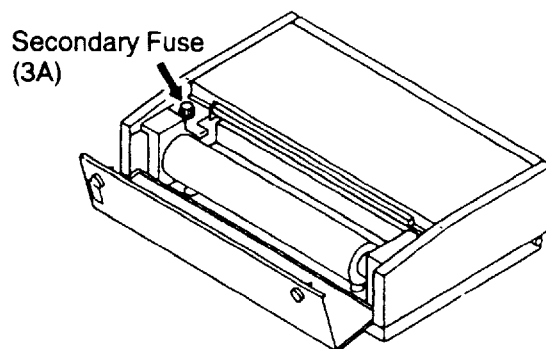
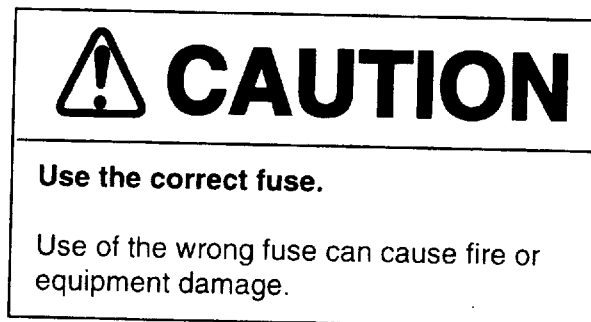
6.4 Replacement of Fuses

Two fuses in the power cable protect the unit from reverse polarity of the power source and equipment fault. If a fuse blows, find out the cause before replacing the fuse.

The primary (input) fuse is located inside the mounting cradle, and protects against overvoltage/reverse polarity of the ship's mains. When the input fuse blows, first check the input voltage and polarity before replacing it with new one.

The secondary (output) fuse is located inside the paper cover, and protects against the internal fault of the equipment. When the output fuse blows, replace it with new one.

If the fuse blows again, call service technician for repair.



6.5 Replacement of the Backup Battery

A lithium battery is used to keep the memory alive, and its estimated life is approximately 5 years. If your unit is exhibiting any of the symptoms shown below, the battery should be replaced. After replacing the battery, always execute the "Cold Start" to clear erratic data from the memory. Refer to page 6-13 for "Cold Start" procedure.

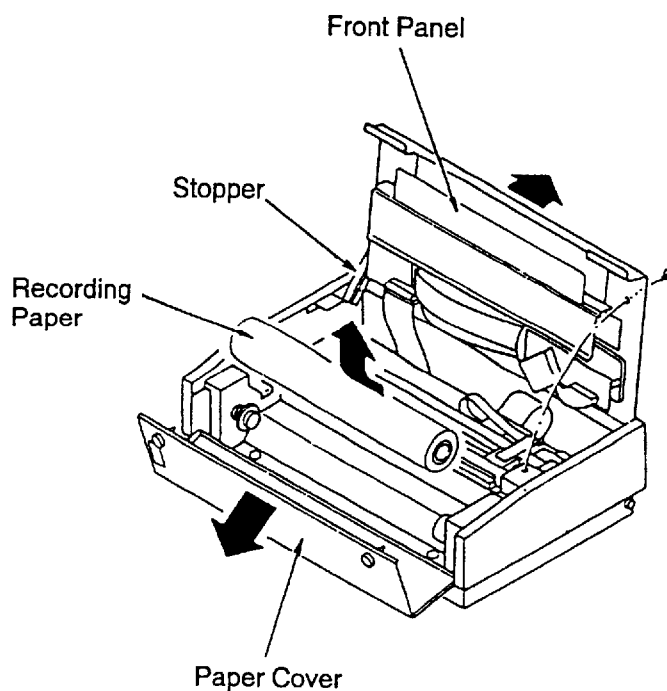
Symptoms When the Battery Voltage is Low

1. The contents of the memory are erased.
2. The time of the internal clock is incorrect.
3. Power cannot be applied.

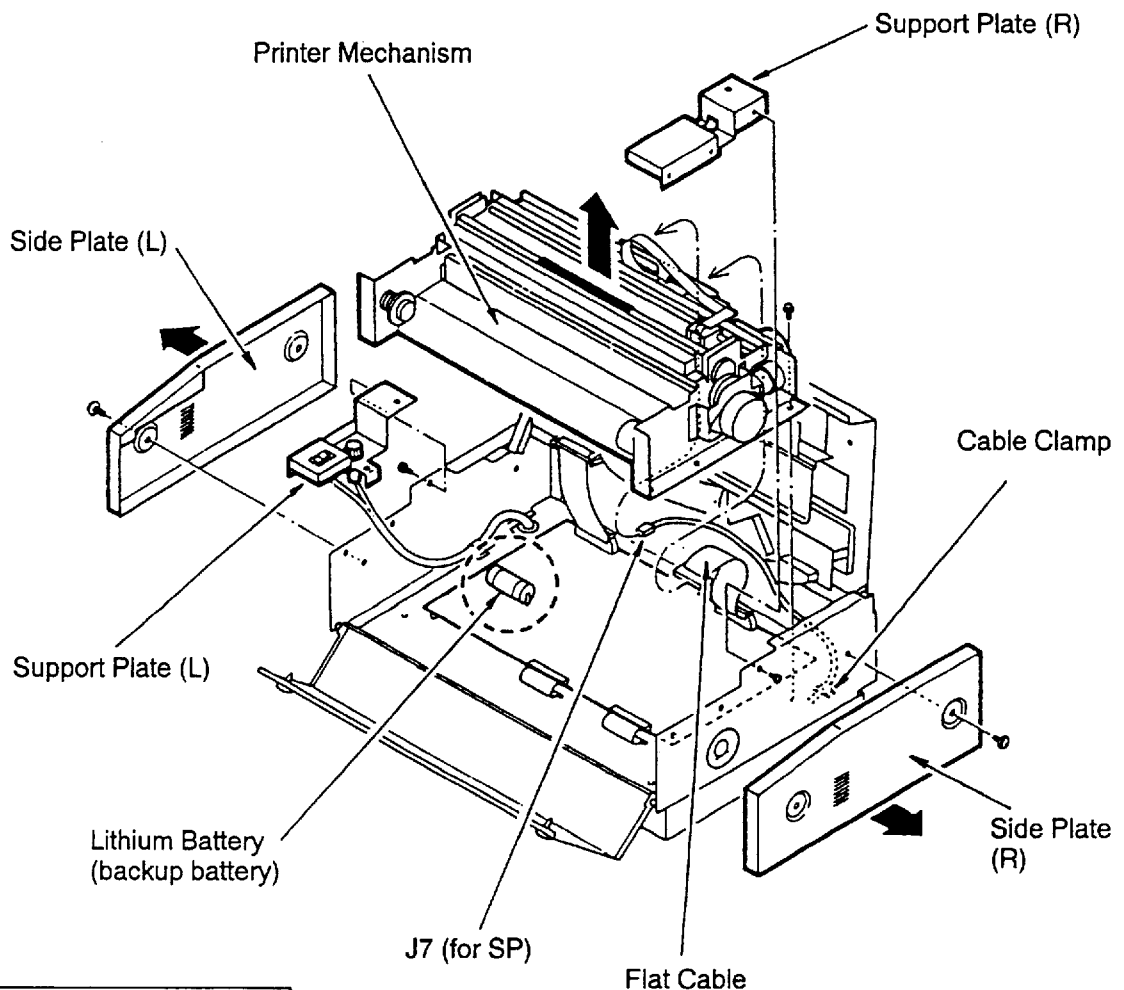
Note: *Frequencies updated or added by operator and timer schedule will be lost by replacing the backup battery. It is recommended to print out the frequency list and schedule list beforehand. (Refer to pages 2-10 and 5-5.)*

Procedure

1. Unplug the POWER connector at the rear panel of the unit.
2. Open the paper cover and the front panel, and then remove the recording paper.



3. Detach the side plates (L & R) and the support plates (L & R).
4. Unplug the flat cable connector on the MAIN CPU board and J7 (for speaker) behind the printer mechanism.
5. Loosen the eight screws fixing the printer mechanism, and then remove the printer mechanism.
6. Disconnect all connectors mated with the MAIN CPU board.
7. Remove the MAIN CPU board by loosening six fixing screws.
8. The lithium battery is soldered on the MAIN CPU board. Replace it with new one.
9. Reassemble the components as they were.



Lithium battery
Type: ER6CN4 3.6V
Code No.: 000-126-013

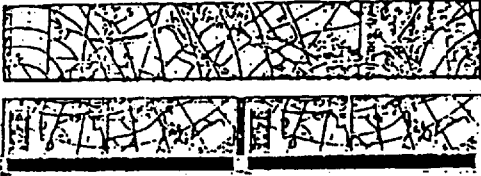


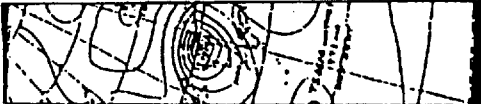
6.6 Troubleshooting List

General

Problems with the equipment may stem from circuit trouble, signal condition, inadequate installation, or even operator error. The troubleshooting list which follows provides typical troubles and the means with which to restore normal operation. If you cannot restore normal operation do not attempt to check inside the unit. Any repair work is best left to a qualified technician.

IF ...	THEN ...	Remedy
you cannot turn on the power	<ul style="list-style-type: none"> check if main switchboard is off. check for loosened or disconnected power connector. check for blown fuse. (Two fuses are located: one at bottom, the other at front.) 	<ul style="list-style-type: none"> Turn on the mains switch. Plug in power connector. Check mains voltage (polarity) and then replace fuse. If it blows again, request service.
LEDs light but no or faint LED display	<ul style="list-style-type: none"> check LCD contrast setting. 	<ul style="list-style-type: none"> Adjust LCD contrast (page 2-1).
garbled characters appear	<ul style="list-style-type: none"> the memory may be corrupted. the back-up battery for preserving memory contents is dead. 	<ul style="list-style-type: none"> Clear the memory (page 6-13). Ask your dealer to replace the battery.
no sound from speaker	<ul style="list-style-type: none"> VOLUME control is set too low. 	<ul style="list-style-type: none"> Adjust the VOLUME control.
noise is present but signal is weak	<ul style="list-style-type: none"> for loosened antenna connector. coaxial cable in antenna cable is shorted or damaged. 	<ul style="list-style-type: none"> Plug in antenna connector. Repair or replace antenna cable.
there is no key response	<ul style="list-style-type: none"> connections inside the unit may have loosened. 	<ul style="list-style-type: none"> Check for loosened connectors inside the unit.
printing does not start	<ul style="list-style-type: none"> there is no paper. ("PAPER OUT" LED is lit.) 	<ul style="list-style-type: none"> Load new roll of paper (Chapter 4).
paper does not advance	<ul style="list-style-type: none"> paper has slipped from supporting catches. RELEASE lever is in "RELEASE" position. 	<ul style="list-style-type: none"> Reload paper. Set RELEASE lever in "LOCK" position.

(Continued on next page)

IF ...	THEN ...	Remedy
paper feeds but nothing is printed	<ul style="list-style-type: none"> paper is loaded with front-side-back. incorrect paper is used. 	<ul style="list-style-type: none"> Load paper correctly. Use specified thermal paper.
recording intensity is improper	<ul style="list-style-type: none"> misadjustment of recording intensity. 	<ul style="list-style-type: none"> Adjust it referring to page 3-4.
multiple or overlapped picture is printed	<ul style="list-style-type: none"> speed is wrong. 	<ul style="list-style-type: none"> Select correct speed (page 3-5).
picture is split (dead sector in middle)	<ul style="list-style-type: none"> picture is out of phase. 	<ul style="list-style-type: none"> Set phase manually (page 3-6).
the picture is shrunk (or enlarged) vertically	<ul style="list-style-type: none"> IOC is wrong. 	<ul style="list-style-type: none"> Change IOC (page 3-5).
picture is printed at an angle	<ul style="list-style-type: none"> change synchronization. 	<ul style="list-style-type: none"> Adjust the SYNC control (page 3-6).
picture is faint or filled with noise	<ul style="list-style-type: none"> signal is weak. frequency is detuned. 	<ul style="list-style-type: none"> Select another frequency. Fine tune frequency.
timer recording does not start as scheduled	<ul style="list-style-type: none"> remote start mode is selected but start signal is not transmitted. improper setting of schedule (for example, two programs overlap each other in time). 	<ul style="list-style-type: none"> Use timer start mode if dead sector is black. Review schedule.
timer schedule is erased	<ul style="list-style-type: none"> the battery which preserves memory contents may be dead. 	<ul style="list-style-type: none"> Ask your dealer to replace the battery.
paper in storage is black	<ul style="list-style-type: none"> paper storage area is too hot or contains active gases. 	<ul style="list-style-type: none"> Store paper in dry, cool place.

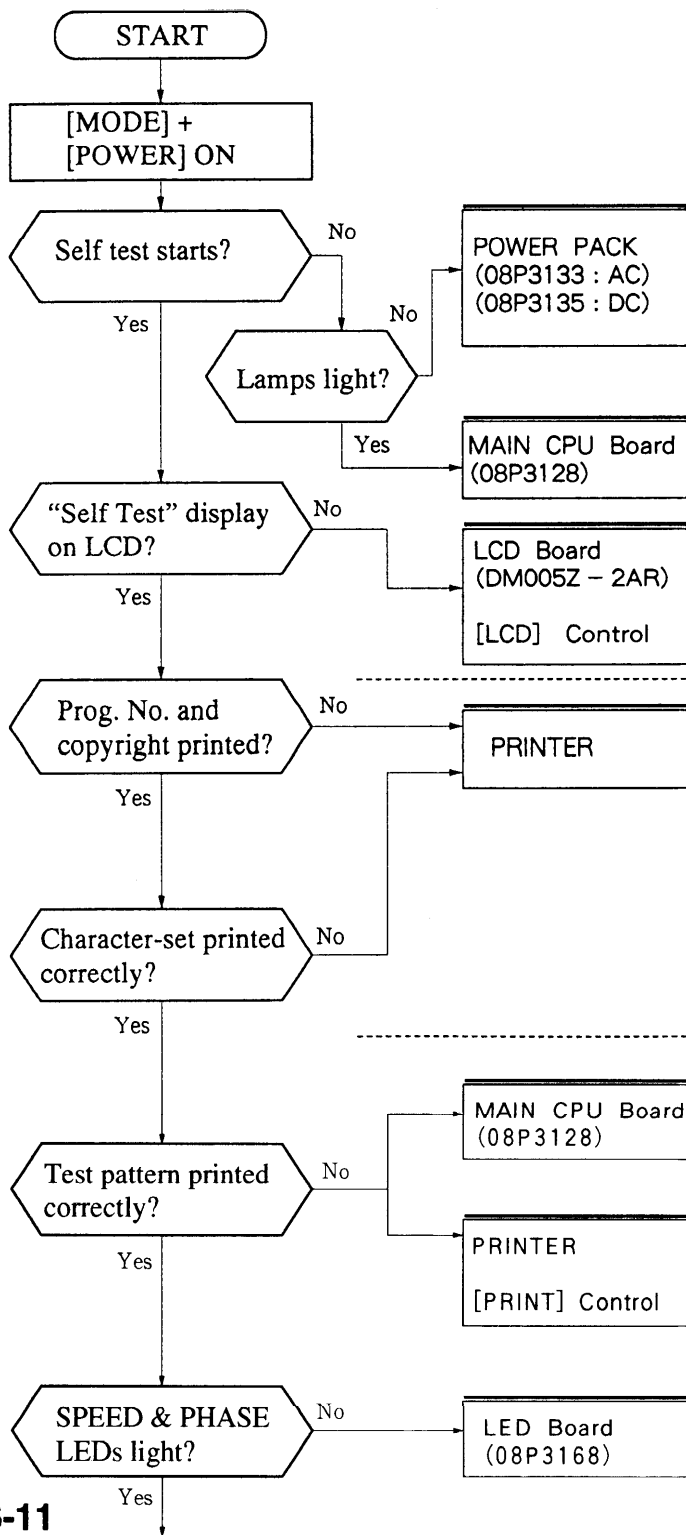
6.7 Self-test

General

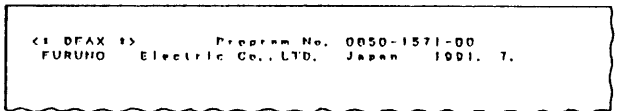
The self-test conducts a general check of the electrical circuits and mechanisms. Before starting the self-test, confirm that the ship's mains voltage is within the rated range and no fuses are blown. Check also that the recording paper is properly loaded.

Procedure

To start the test, press the POWER switch while holding down the [MODE] key.



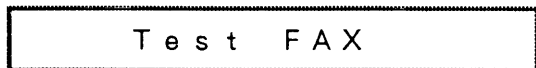
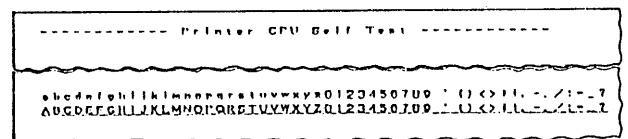
Prints program version number and copyright message.



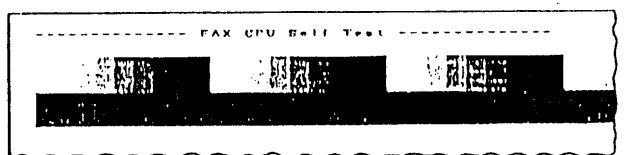
* Program number (and the date of issue) is subject to change.



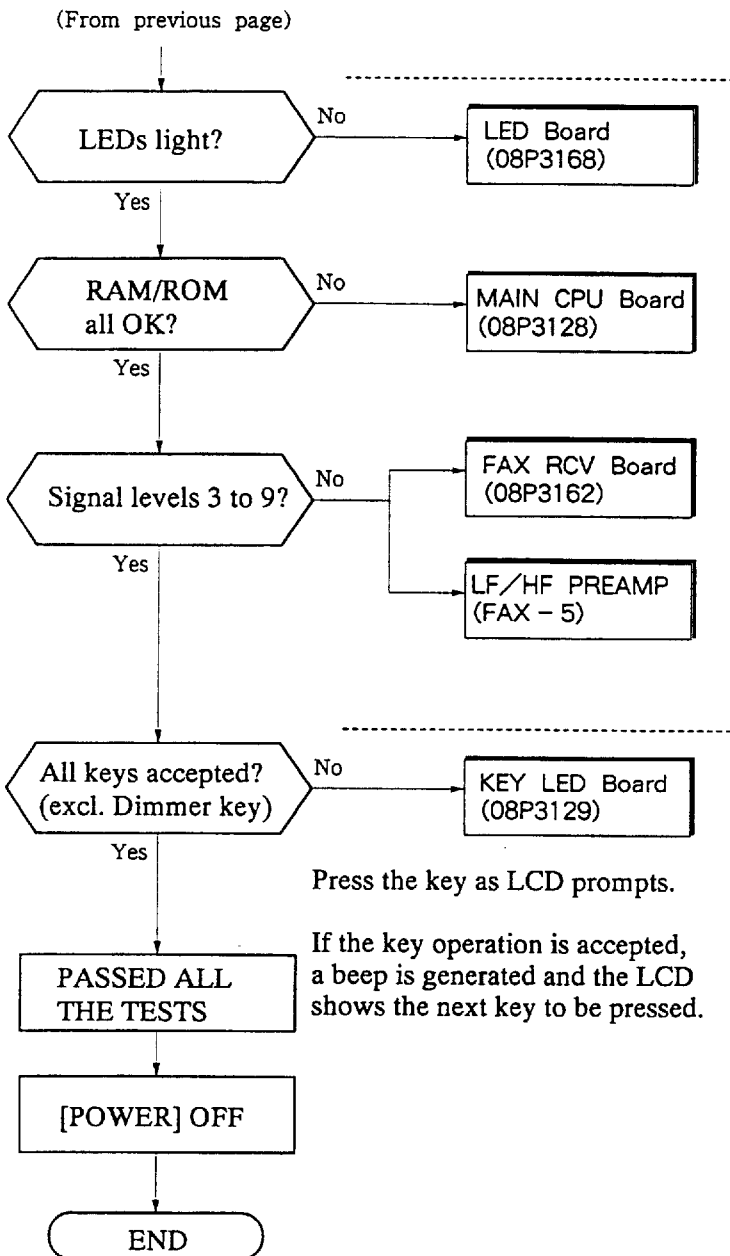
Prints complete character-set.



Prints eight-tone checker pattern.



PHASE and SPEED LEDs light.



Test Master

Checks RAM/ROM on MAIN CPU.
Light all LEDs on front panel.

Receives standard time signal (WWX,
JJY, MSF, ZUO, etc.) at 5, 10 and 15MHz
and prints each signal level (0 to 9)
If abnormal, signal level will be 0 to 2.

Push [RCL/PRG]

Push [MODE]

All key OK

End of Self Test

Press the key as LCD prompts.
If the key operation is accepted,
a beep is generated and the LCD
shows the next key to be pressed.

6.8 Clearing the Memory (Cold Start)

When to clear the memory

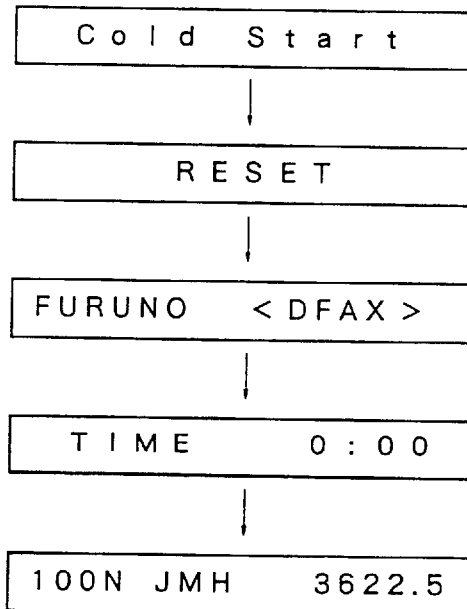
The FAX-215 retains all user-entered information, such as time, timer programs and frequencies, in a memory. A “back-up” battery, of which the estimated life is five years, preserves the contents of the memory when the power is off. However, the contents of the memory may become jumbled because of a dead battery. When this occurs, clear the memory to remove any stray data that may still remain there after replacement of the battery. All data are cleared and the unit starts operation with default settings. If the information you have entered is important to you, jot it down in a log before clearing the memory.

Procedure

1. Turn off the power. While pressing and holding down the [CH] key, turn on the power. Release the [CH] key when the following message appears.

C o l d S t a r t ?

2. Press the [ENT] key. The display changes in the following sequence.



7. SPECIFICATIONS

RECORDER SECTION

- Recording System: Serial thermal recording system (24 dot)
- Scanning Speed: 60, 90, 120 and 240 rpm
- Index of Cooperation: 576 (high density) and 288 (low density)
(I.O.C.)
- Recording Resolution: 5 lines/mm approx.
- Gradation: Eight levels
- Recording Controls:
- a. Start/stop
Automatic by schedule timer and/or
WMO remote control signals, or Manual
 - b. Scanning speed
Automatic or Manual
 - c. I.O.C.
Automatic by WMO start signals or Manual
 - d. Phase matching
Automatic by line sync. signal or Manual
- External Input Signal: Black 1500Hz, white 2300Hz FSK or FM signal
(signal level; 0 dBm at 600 ohms)
- Recording Paper: Thermal paper TP-15150, 400mm(W) × 150m(L),
effective width 384mm

RECEIVER SECTION

- Frequency Range: LF: 80kHz to 160kHz in 100 Hz steps
MF/HF: 2MHz to 25MHz in 100Hz steps
- Number of Channels: All existing facsimile stations and frequencies plus 310
private frequencies (both re-programmable by operator)

-
- Frequency Selection:
 - Automatic channel search for highest signal strength within a selected zone/station
 - Manual selection of zone, station and channel number
 - Manual tuning in 100 Hz steps by front panel controls
- Tuning Indication: Flow-up/flow-down (detuned) and steady (tuned) by three LEDs
- Class of Emission: F3C, J3C (USB/LSB selectable)
- Receiving Sensitivity: LF: better than 10 μ V at 20dB SINAD
MF/HF: better than 2 μ V at 20dB SINAD
- Selectivity: 2.6kHz at - 6dB
8kHz at - 60dB

GENERAL SPECIFICATIONS

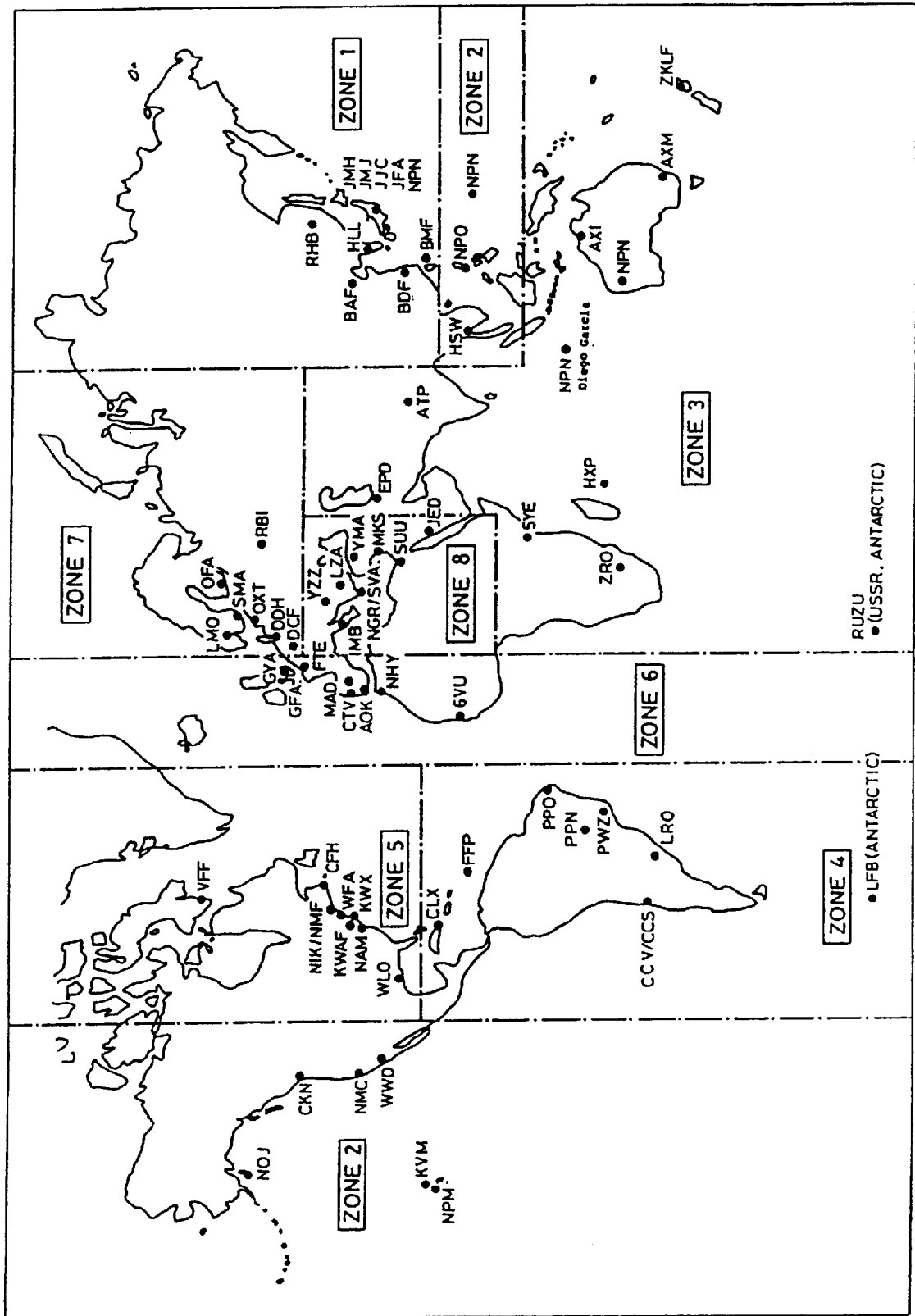
- Power Supply: 10 to 40VDC universal or
86 to 132VAC/170 to 264VAC (universal), 1 ϕ , 50/60Hz
- Power Consumption: DC set, Stand-by: less than 15W
Recording: less than 27W
AC set, Stand-by: less than 20VA
Recording: less than 40VA
- Environmental Condition: - 15 $^{\circ}$ C to +55 $^{\circ}$ C (95%RH at 35 $^{\circ}$ C)

LF/HF PREAMP UNIT (FAX- 5: Option)

- Frequency Range: 80kHz to 30MHz
- Applicable Antenna: Wire antenna or 2.6m Whip antenna
- Input Protection: Protected against 30Vrms antenna input for 15 minutes
- Output Impedance: 50 ohms

APPENDIX 1 FACSIMILE STATION MAP/STATION LIST

Facsimile Station Map



ZONE 1 NORTH PACIFIC OCEAN WESTERN PART

STATION	CALL SIGN	TRANSMITTED FROM
0	JMH	Tokyo JAPAN
1	JMJ	Tokyo JAPAN
2	JJC	Tokyo JAPAN
3	9VF *	Tokyo Via SINGAPORE
4	JFA	Tokyo JAPAN
5	3SD	Beijing CHINA
6	BAF	Beijing CHINA
7	BDF	Shanghai CHINA
8	BMF	Taipei TAIWAN
9	RHB	Khabarovsk RUSSIA
9	HLL	Seoul KOREA

ZONE 2 NORTH PACIFIC OCEAN EASTERN PART

STATION	CALL SIGN	TRANSMITTED FROM
0	NPN	Guam
1	NPO	Sanglay Point MARIANA IS.
2	HSW	Bangkok PHILIPINES
3	NPM	Pearl Harbour THAILAND
4	KVM	Honolulu USA
5	NOJ	Kodiak Alaska USA
6	CKN	Esquimalt CANADA
7	NMC	San Francisco USA
8	WWD	La Jolla USA
9	AUX	

ZONE 3 SOUTH PACIFIC OCEAN, INDIAN OCEAN, PERSIAN GULF

STATION	CALL SIGN	TRANSMITTED FROM
0	AXI	Darwin AUSTRALIA
1	AXM	Camberra AUSTRALIA
2	ZKLF	Auckland NWE ZEALAND
3	NPN	Guam Via AUSTRALIA
4	ATP	New Delhi India
5	EPD	Teheran IRAN
6	5YE	Guam Via Diego Garcia
7	ZRO	Pretoria KENYA
8	HXP	Saint Denis SOUTH AFRICA
9	FUZU	Molodezhnaya MAURITIUS
		RUSSIA

ZONE 4 SOUTH ATLANTIC OCEAN

STATION	CALL SIGN	TRANSMITTED FROM
0	CLX	Casablanca CUBA
1	FFP	Fort de France MARTINIQUE
2	GYA	
3	PPN	Brasilia BRASIL
4	PWZ	Rio de Janeiro BRASIL
5	PRO *	Orinda BRASIL
6	LRO	Buenos Aires ARGENTINE
7	CCS	Santiago CHILE
8	CCV	Belloto CHILE
9	LFB	Centro Meteorologico ANTARCTIC
9	CBV	Valparaiso Armada de CHILE

ZONE 5 NORTH ATLANTIC OCEAN WESTERN PART

STATION	CALL SIGN	TRANSMITTED FROM
0	WLO	Mobile USA
1	NAM	Norfolk USA
2	KWAF	Washington DC USA
3	KW	Lewes USA
4	WFH	Dalaware USA
5	NIK	Brentwood USA
6	NMF	Boston USA
7	CFH	Halifax CANADA
8	VFF	Frobisher CANADA
9	OXT	Skamlebaek GREENLAND
9	XPM	

ZONE 6 NORTH ATLANTIC OCEAN EASTERN PART

STATION	CALL SIGN	TRANSMITTED FROM
0	GFA	Bracknell UK
1	GFA	Bracknell UK
2	GYA	Northwood UK
3	GZZ *	
4	GYJ *	
5	FTE	Paris FRANCE
6	CTV	Monsanto PORTUGAL
7	ADK	Rota SPAIN
8	MAD	Madrid SPAIN
9	NPN *	
9	NHY	Kenitara MOROCCO
9	6VU	Dakar SENEGAL
9	AUX	

ZONE 7 NORTH ATLANTIC OCEAN NORTHERN PART

STATION	CALL SIGN	TRANSMITTED FROM
0	DCF	Offenbach GERMANY
1	DDK	Hamburg GERMANY
2	DDH *	
3	OXT	Copenhagen DENMARK
4	OLT	Praha-Modrany CZECHOSLOVAKIA
5	SMA	Norrkoping SWEDEN
6	LMO	Oslo NORWAY
7	OFA	
8	OFH *	Helsinki FINLAND
9	OHG *	
9	OFW	Vaasa FINLAND
9	TFA *	Reykjavic ICELAND
9	RBI	Moscow USSR
9	AUX	

ZONE 8 MEDITERRANEAN SEA

STATION	CALL SIGN	TRANSMITTED FROM
0	IMB	Rome ITALY
1	NPN	
2	SVG4 *	Ahtens GREECE
3	YZZ	Beograde YUGOSLAVIA
4	NGR	Ahtens GREECE
5	LZJ2	Sofia BULGALIA
6	YMA	Ankara TURKEY
7	MKS	Episkopi CYPRUS
8	SUU	Cairo EGYPT
9	JED	Jeddah SAUDI ARABIA
9	HZN *	
9	AUX	

FACSIMILE STATION LIST

ZONE[0] is allocated for private channels.
(10 channels each for 12 stations)
*: Callsign not displayed.

Facsimile Station List (alphabetical order)

	Nation	City	Zone No.	Station No.	Call sign	Remarks		Nation	City	Zone No.	Station No.	Call sign	Remarks
A	ANTARCTIC	Meteorologic.	4	8	LFB		M	MARIANA IS.	Guam	2	0	NPN	US Navy
	ARGENTINE	Buenos Aires	4	5	LRO			MARTINIQUE	Fort de France	4	1	FFP	
	AUSTRALIA	Canberra	3	1	AXM			MAURITIUS	Sain Denis	3	8	HXP	
		Darwin	3	0	AXI			MOROCCO	Kenitara	6	7	NHY	
		H.E.Holt	3	3	NPN	US Navy							
B	BRAZIL	Brasilia	4	3	PPN		N	NEW ZEALAND	Auckland	3	2	ZKLF	
		Orinda	4	4	PPO			NORWAY	Oslo	7	5	LMO	
		Rio de Janeiro	4	4	PWZ		P	PHILIPPINES	Sanglay Point	2	1	NPO	US Navy
	BULGARIA	Sofia	8	4	LZJ2			PORTUGAL	Monsanto	6	4	CTV	
C	CANADA	Esquimalt	2	6	CKN		S	SENEGAL	Dakar	6	8	6VU	
		Frobisher	5	8	VFF			SAUDI ARABIA	Jeddah	8	8	JED	
		Halifax	5	7	CFH							HZN	
	CHILE	Belloto	4	7	CCV			SOUTH AFRICA	Pretoria	3	7	ZRO	
		Santiago	4	6	CCS			SPAIN	Rota	6	5	AOK	US Navy
		Valparaiso	4	9	CBV				Madrid	6	6	MAD	
	CHINA	Beijing	1	4	3SD					7	4	NPN	
		Beijing	1	5	BAF			SWEDEN	Norrkoping	7	4	SMA	
		Shanghai	1	6	BDF								
	CUBA	Casablanca	4	0	CLX		T	TAIWAN	Taipei	1	7	BMF	
	CYPRUS	Episkopi	8	6	MKS			THAILAND	Bangkok	2	2	HSW	
	CZECHOSLOVAKIA	Praha-Modrany	7	3	OLT			TURKEY	Ankara	8	5	YMA	
D	DENMARK	Copenhagen	7	2	OXT		U	UK	Bracknell	6	0	GFA	
E	EGYPT	Cairo	8	7	SUU				Bracknell	6	1	GFA	
F	FINLAND	Heisinki	7	6	OFA				Northwood	4	2	GYA	For S.A.
					OHG				Northwood	6	2	GYA	
	FRANCE	Vaasa	7	7	OFH			USA	Boston	5	5	NIK	
		Paris	6	3	OHG				Boston	5	6	NMF	
					OFW				Brentwood	5	4	WFH	
	GREECE	Athens	8	1	FTE				Diego Garcia	3	5	NPN	
									Honolulu	2	4	KVM	
	GREENLAND	Athens	8	3	NPN	US Navy			Kodiak Alaska	2	5	NOJ	
		Skamlebaek	5	9	SVG4				La Jolla	2	8	WWD	
					NGR				Lewes	5	3	KWX	
					OXT				Delaware	5	3	KWX	
					XPM				Mobile	5	0	WLO	
I	ICELAND	Reykjavik	7	7	TFA				Norfolk	5	1	NAM	
	INDIA	New Delhi	3	4	ATP				Pearl Harbour	2	3	NPM	US Navy
	IRAN	Teheran	3	5	EPD				San Francisco	2	7	NMC	
	ITALY	Rome	8	0	IMB				Washington DC	5	2	KWAF	AIR Force
J	JAPAN	Tokyo	1	0	JMH	No.1		RUSSIA	Khabarovsk	1	8	RHB	
		Tokyo	1	1	JMJ	No.2			Molodezhnaya	3	9	RUZU	
		Tokyo	1	2	JJC	JMSA & Kyodo			Moscow	7	8	RBI	
		Tokyo	1	3	9VF	Chuo Gyogyo			Hamburg	7	1	DDK	
					JFA		W	GERMANY	Offenbach	7	0	DDH	
K	KENYA	Nairobi	3	6	5YE				Belgrade	8	2	YZZ	
	KOREA	Seoul	1	9	HLL		Y	YUGOSLAVIA					

APPENDIX 2

USER FREQUENCY LISTS

Private Channel List

Zone	Station	Channel	Call sign on LCD	Actual call sign	Freq.	Remarks
0	[]	0	PRV			
		1	PRV			
		2	PRV			
		3	PRV			
		4	PRV			
		5	PRV			
		6	PRV			
		7	PRV			
		8	PRV			
		9	PRV			

Zone	Station	Channel	Call sign on LCD	Actual call sign	Freq.	Remarks
0	[]	0	PRV			
		1	PRV			
		2	PRV			
		3	PRV			
		4	PRV			
		5	PRV			
		6	PRV			
		7	PRV			
		8	PRV			
		9	PRV			

Zone	Station	Channel	Call sign on LCD	Actual call sign	Freq.	Remarks
0	[]	0	PRV			
		1	PRV			
		2	PRV			
		3	PRV			
		4	PRV			
		5	PRV			
		6	PRV			
		7	PRV			
		8	PRV			
		9	PRV			

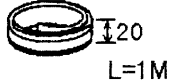
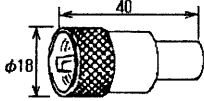
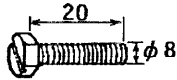
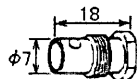
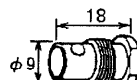
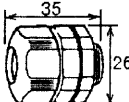
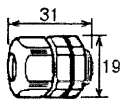
Timer Program List

No.	Zone	Station	CH	Speed	Start signal	Time		Off/On	Remarks
						Start	Stop		
1				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
2				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
3				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
4				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
5				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
6				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
7				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
8				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
9				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
10				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
11				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
12				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
13				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
14				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
15				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
16				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	

APPENDIX 2 USER FREQUENCY LISTS

No.	Zone	Station	CH	Speed	Start signal	Time		Off/On	Remarks
						Start	Stop		
1				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
2				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
3				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
4				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
5				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
6				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
7				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
8				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
9				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
10				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
11				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
12				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
13				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
14				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
15				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
16				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	

CODE NO.	000-075-041	08AQ-X-9401-1 1/1
TYPE	CP08-01300	

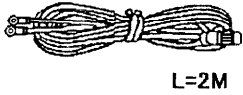
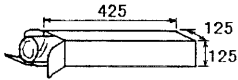
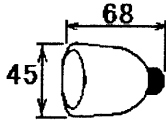
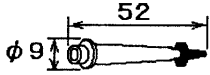
工事材料表 INSTALLATION MATERIALS					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	銅板 COPPER STRAP		0.3X20X1000MM	1	
			CODE NO. 000-810-230		
2	同軸プラグ COAX. PLUG		FM-MP-7	1	
			CODE NO. 000-108-859		
3	六角ボルト (スリ割付) HEX. BOLT (SLOTTED HEAD)		M8X20 SUS304	6	
			CODE NO. 000-862-147		
4	アダプタ REDUCER (S)		MP-M3A	1	
			CODE NO. 000-108-860		
5	アダプタ REDUCER (L)		MP-M5A	1	
			CODE NO. 000-108-861		
6	SCロック SC LOCK		SCL-10B	2	
			CODE NO. 000-104-146		
7	SCロック SC LOCK		SCL-6B	3	
			CODE NO. 000-112-376		

DWG NO. C6256-M01- E

FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

CODE NO.	000-075-042	08AQ-X-9501-2 1/1
TYPE	FP08-00700	

付属品表 ACCESSORIES					
番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	ケーブル組品 CABLE ASSEMBLY	 L=2M	08S4083	1	
			CODE NO. 000-114-117		
2	サーマル紙 THERMAL PAPER		TP-15150	2	
			CODE NO. 000-805-657		
3	潤滑油 LUBRICATION OIL		マシン油 MACHINE OIL	1	
			CODE NO. 000-824-035		
4	油差し先 LUBRICATOR		注油器先のみ 30CC	1	
			CODE NO. 000-831-549		

DWG NO. C6256-F01- G

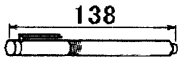
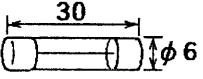
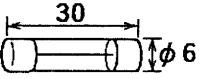
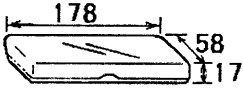
FURUNO ELECTRIC CO., LTD.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

A-3

CODE NO.	000-075-039	08AQ-X-9301 -1
TYPE	SP08-01400	BOX NO. P

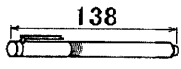
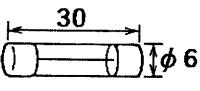
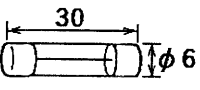
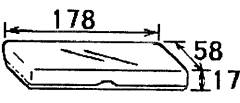
SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
				(A C用)			
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	ヘッドクリーナー HEAD CLEANER		TH-2000(本体)			1	000-122-997
2	ヒューズ FUSE		FGBO 2A AC250V	4		4	000-549-020
3	ヒューズ FUSE		FGBO-A 3A AC125V	2		2	000-549-063
4	予備品箱 SPARE PARTS BOX		F7103カ			1	000-831-610
MFR'S NAME	FURUNO ELECTRIC CO.,LTD.			DWG NO.	C6256-P01- G		1/1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

A-4

CODE NO.	000-075-040	08AQ-X-9302 -1
TYPE	S008-01410	BOX NO. P

SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL
				(D C 用)			
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	ヘッド クリーナー HEAD CLEANER		TH-2000 (本体)		1		000-122-997
2	ヒューズ FUSE		FGBO 7A AC125V	4		4	000-549-013
3	ヒューズ FUSE		FGBO-A 3A AC125V	2		2	000-549-063
4	予備品箱 SPARE PARTS BOX		F7103D			1	000-831-610
MFR'S NAME		FURUNO ELECTRIC CO., LTD.		DWG NO.	C6256-P02- G		1/1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

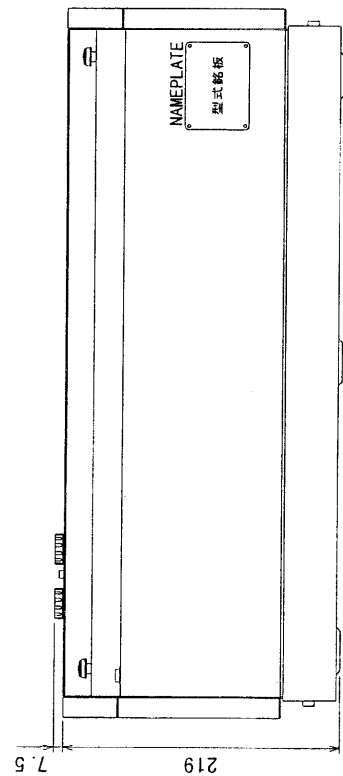
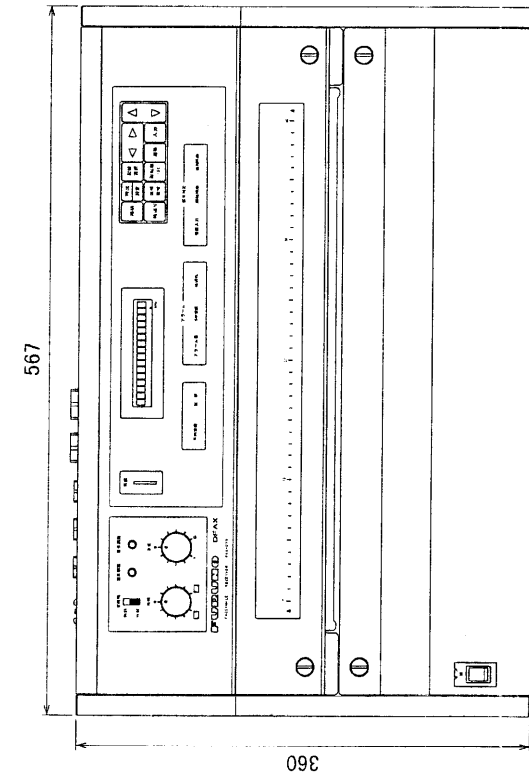
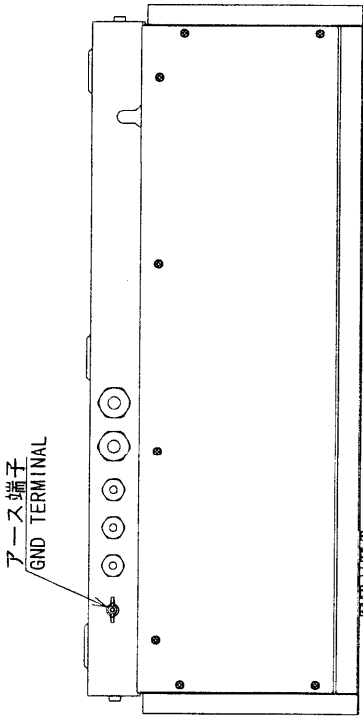
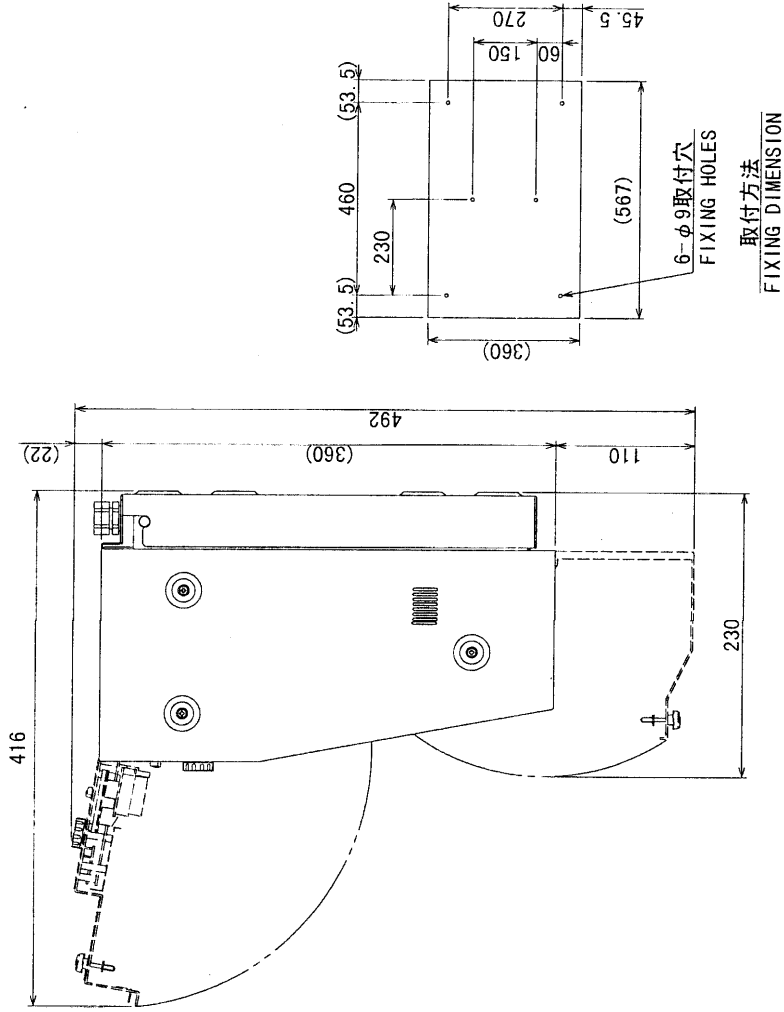


表 1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3

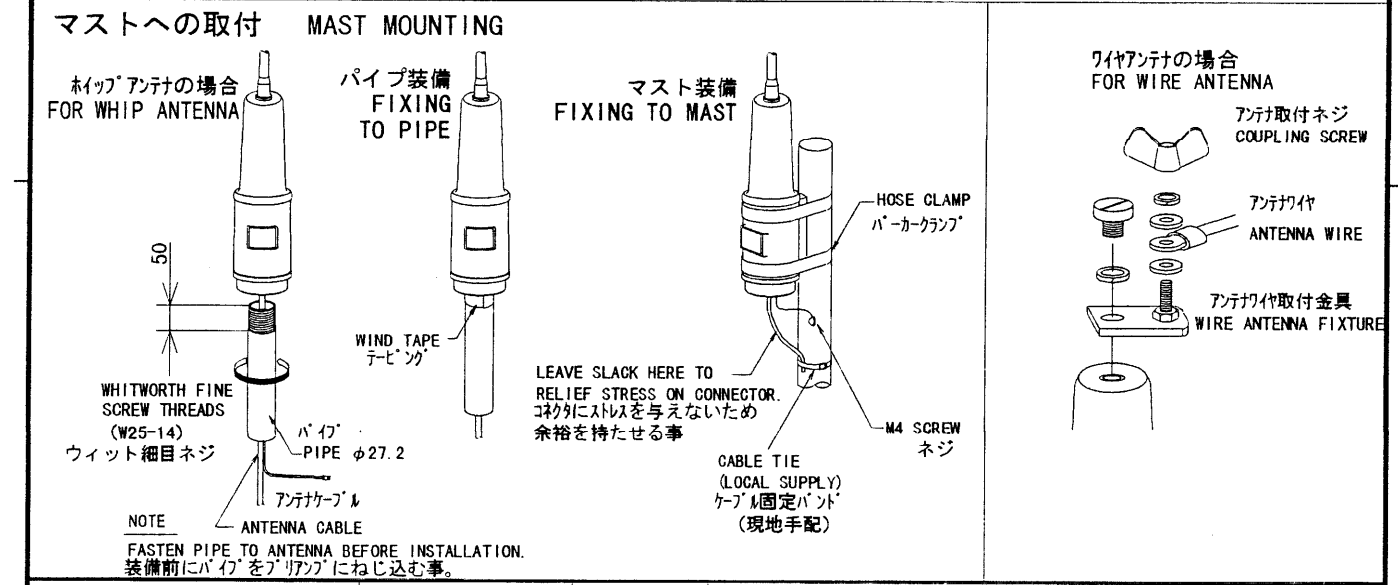
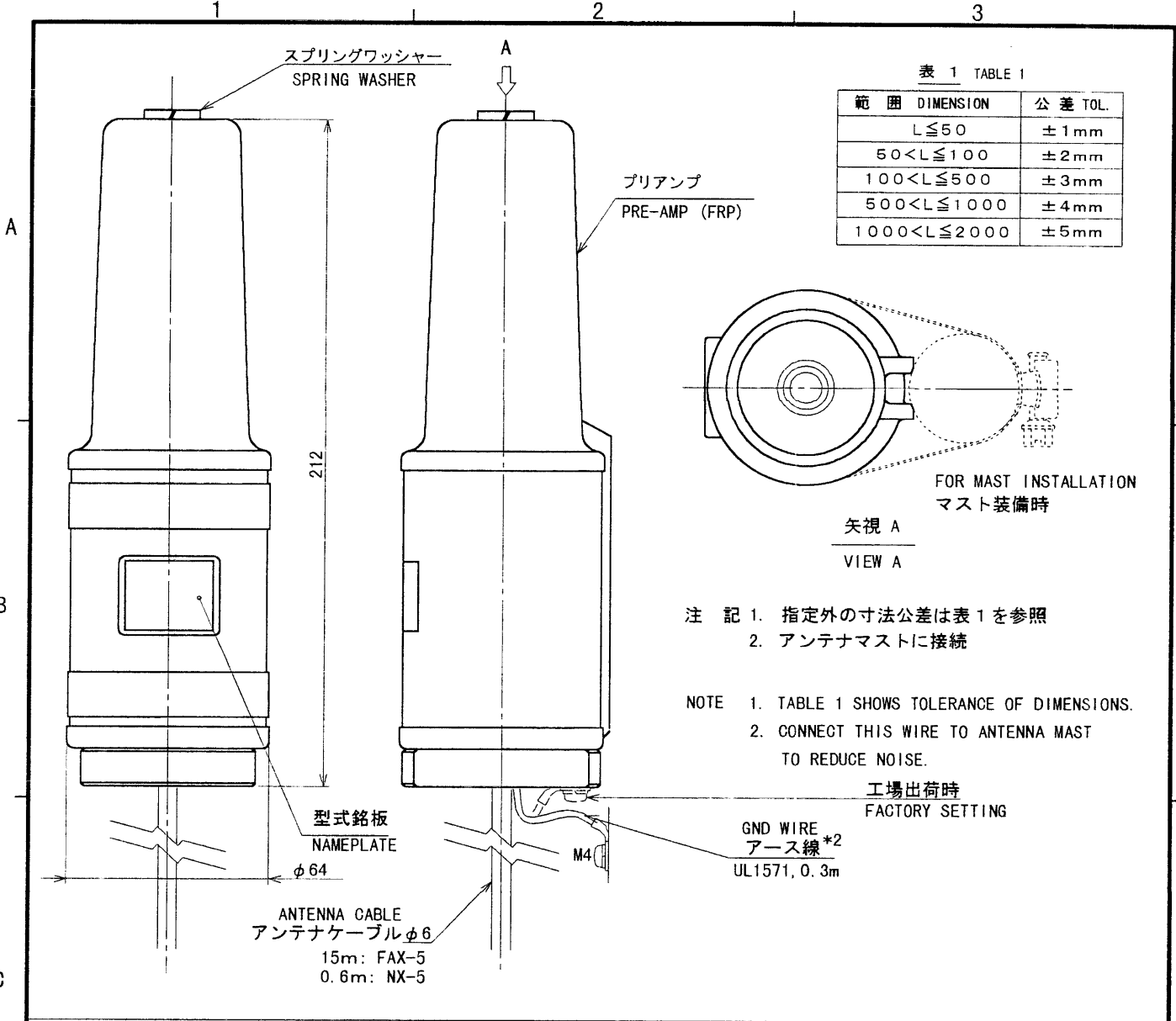
注 記
1) 指定なき寸法公差は表 1 による。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

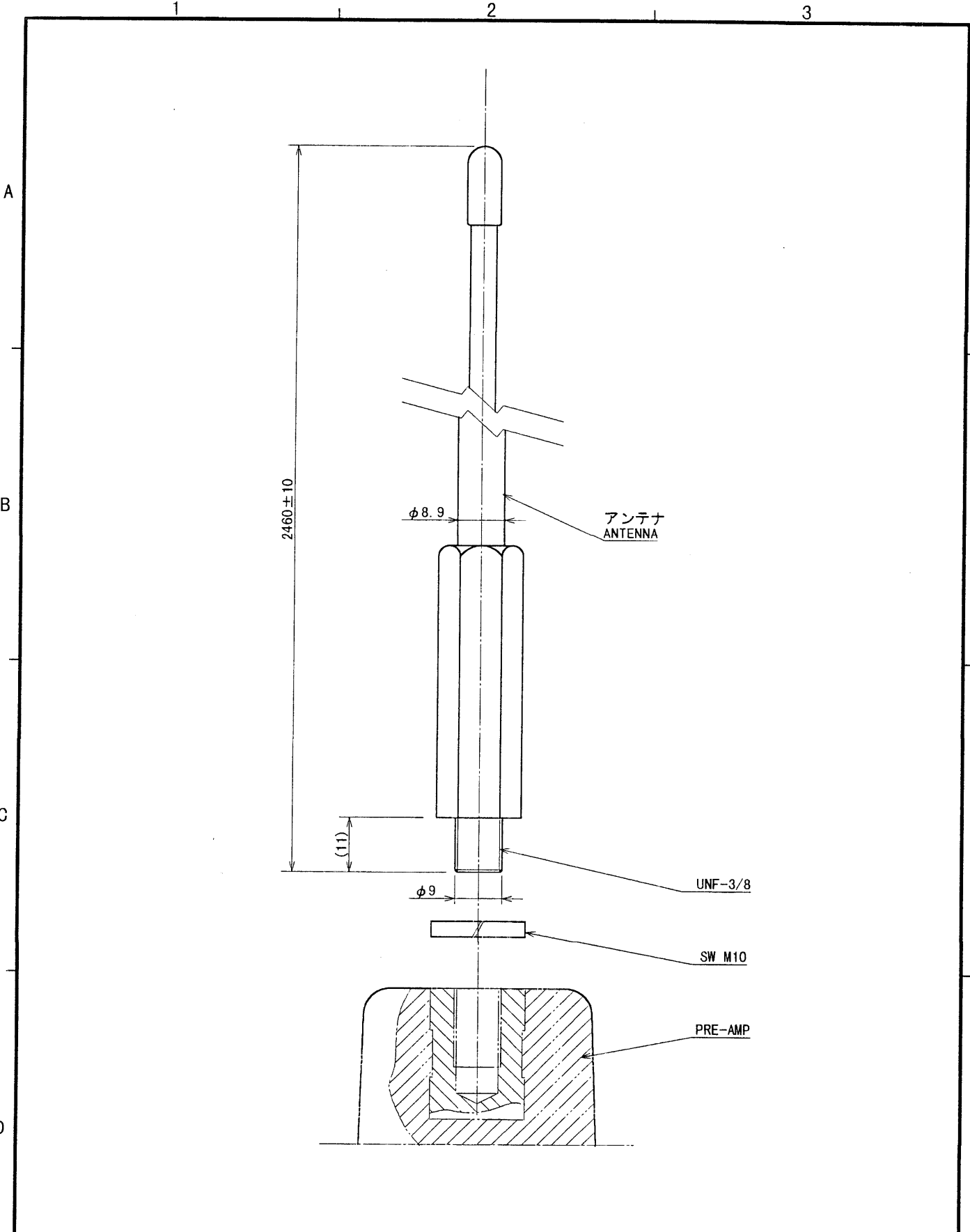


DRAWN 2009.11.18 H. H. H.	TITLE FAX-215
CHECKED 2009.11.18 K. K.	名称 ファクシミリ受信機
APPROVED 2009.11.18 K. K.	外寸図
SCALE 1/6	NAME FACSIMILE RECEIVER
MASS 17 kg	DWG. No. 08-017-0150-0
C6256-G01-C	OUTLINE DRAWING

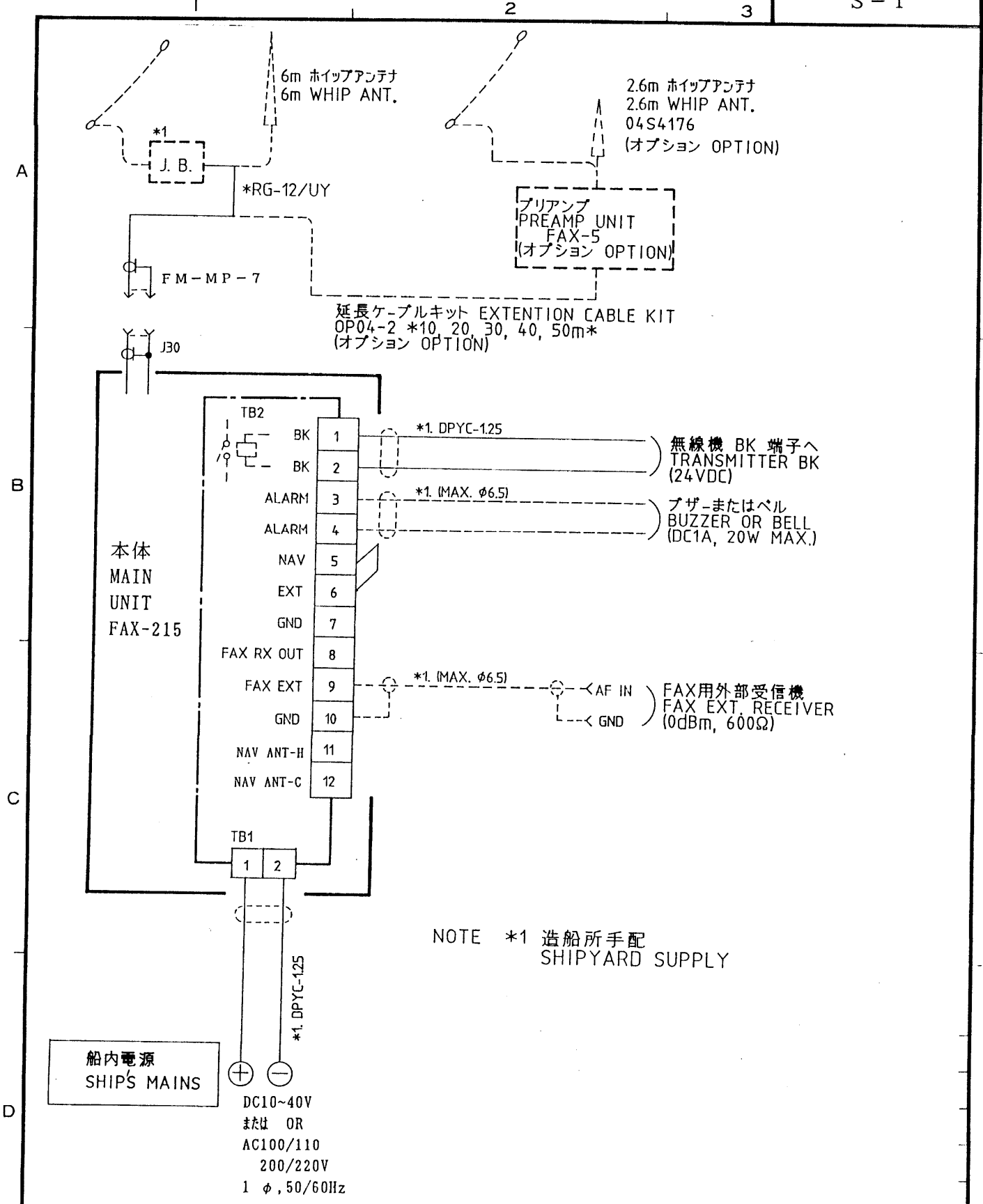
記録紙付質量: 21 kg
MASS W/ PAPER: 21 kg



DRAWN June 28 '00 T.YAMASAKI	TITLE FAX-5/NX-5
CHECKED June 26 '00 Y. Kim	名称 プリアンプ
APPROVED June 26 '00 Y. Kim	外寸図
SCALE 1/2 MASS 0.6 kg (本体のみ) MASS W/O CABLE.	NAME PRE-AMP UNIT
DWG. No. C6244-003-J	OUTLINE DRAWING



DRAWN <i>June 27 '60 T. YAMASAKI</i>		TITLE 04S4176-1	
CHECKED <i>June 27 '60 Y. Kim</i>		名称 2.6m ホイップアンテナ	
APPROVED <i>June 27 '60 Y. Kim</i>		外寸図	
SCALE 1/1	MASS 0.5 kg	NAME 2.6m WHIP ANTENNA	
DWG. No. C4002-018-F		OUTLINE DRAWING	

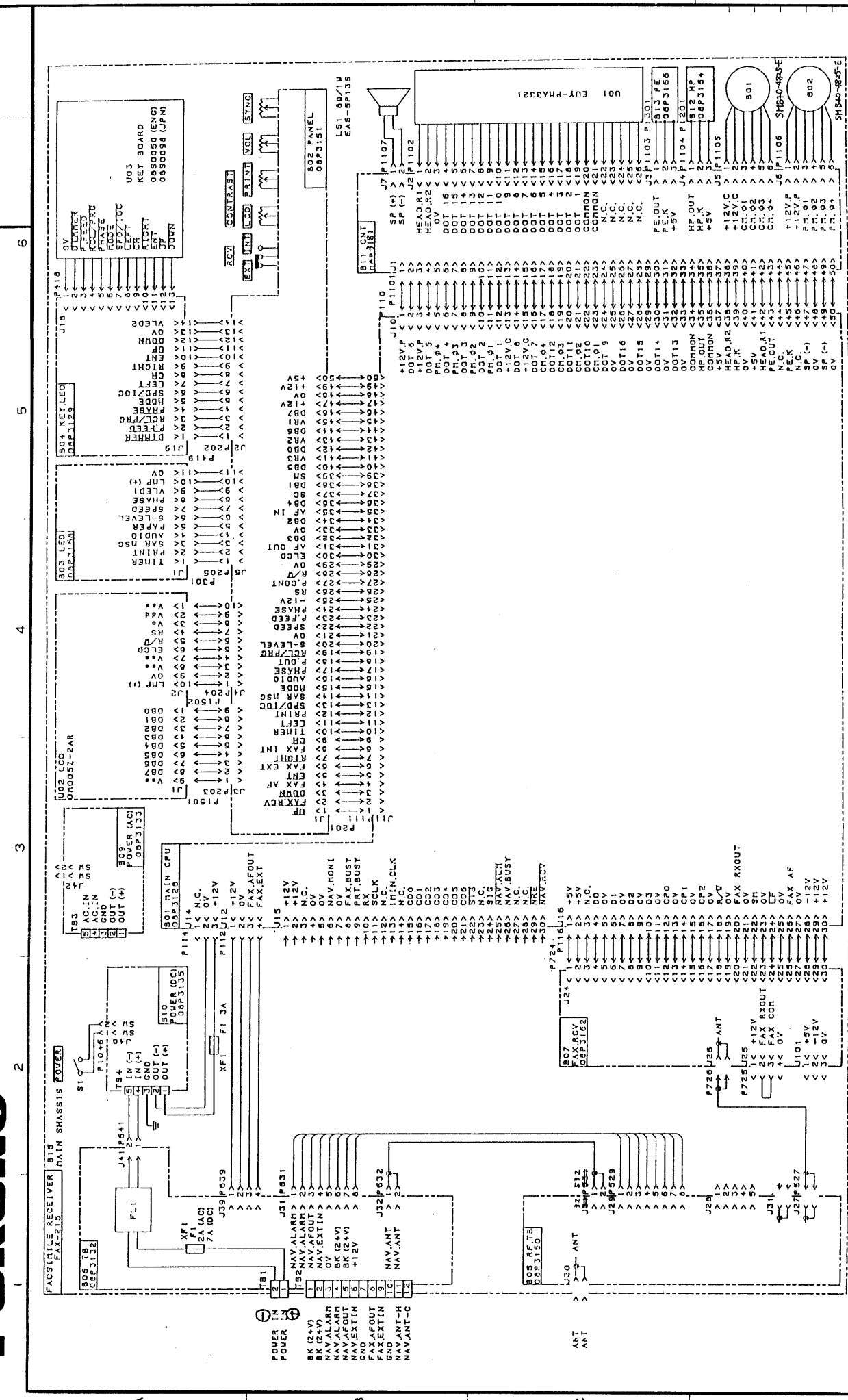


NOTE *1 造船所手配 SHIPYARD SUPPLY

船内電源
SHIPS MAINS

DC10~40V
または OR
AC100/110
200/220V
1 φ, 50/60Hz

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG.NO.	摘要 REMARKS
承認 APPROVED	May. 21. '93 M. IKEDA	三角法 THIRD ANGLE PROJECTION	名称 TITLE	相互結線図 FAX-215 INTERCONNECTION DIAGRAM	
検図 CHECKED	May. 21. '93 T. SAITO	尺度 SCALE	重量 WEIGHT	図番 DWG.NO.	C6256-C03-B
製図 DRAWN	May. 21. '93 T. NISHINO				



品番 品名 数量 材料 数量 品番 数量

ITEM NAME QTY MATERIAL QTY

承認 May. 21. '93 APPROVED M. IKAIDA 承認 May. 21. '93 CHECKED T. SAITO 製図 May. 21. '93 DRAWN T. SAITO

名称 三角法 THIRD ANGLE PROJECTION 圖名 總合回路図 GENERAL

尺 度 R SCALE

重量 WEIGHT

番 號 圖 番 號 DWG. NO. C 6 2 5 6 - K 0 1 - B

圖 番 DWG. NO. 圖 番 DWG. NO.

REMARKS