

## SERVICE INSTRUCTIONS : NDH518 MEMORY UNIT

### GENERAL

The block diagram and schematic for the memory unit are shown in the appendix. The unit is made up of a memory circuit utilising six integrated circuits type  $\mu$ PD5101LC. These IC are 1K CMOS static RAM (256 x 4) where the FF is used to store data, clocks are not needed, and the information stays in storage as long as power is supplied. It should be noted that an optional battery(s) can be installed to back up data stored.

Important - Alkaline batteries should be used as commonly used manganese types will possibly leak when they become exhausted. Any consequent damage is not covered by warranty.

Frequency data is transferred from the receiver via the three state buffers (IC 9, 10, 11, 12, 13, 14).

Data input and memory output is via the cable terminated with the plug P4.

96 frequencies can be put in memory (24 channels per channel switch x 4 - A, B, C, D, selected by the push button switches).

The channel is designated by specifying the address of the RAM's by the channel switches and this information is simultaneously sent to the channel display circuit, IC7 and IC3.

The power source voltage detecting circuit controls the chip enable terminal of the RAM's in order to protect the memory frequency data from being lost when the power switch is turned off.

The power detecting circuit is TR2/IC16.

### POWER

Since CMOS is used, power supply requirements are low. 10-11V from the receiver is supplied through P4 and P7/J7 pin 2,3 and regulated to 5V through IC17.

### DATA - TESTING

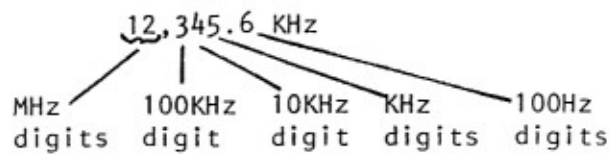
The table below shows the INPUT state of data from the receiver for each of the digits that are capable of being displayed on the receiver. Levels for all digits representing 100Hz, 1KHz, etc. are similar, the exception being the digits representing tens of MHz and the 20MHz digit.

If incorrect levels are being returned from the memory resulting in an incorrect display, isolation of the faulty digit(s) may be made by comparing actual level on the appropriate pins of J7.

### PROCEDURE

1. Set the receiver in manual.
2. Check with logic tester to see if the levels are according to the following table as each digit is selected. Increment the tuning

knob or band switch as required to access the digits corresponding to their place in the dialled up frequency, e.g.



J7 PINS

<u>100Hz UNITS</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H

H = HIGH ≈ 5V

Similar levels will be evident for KHz, tens KHz, and 100KHz digits.  
 1KHz Pins are on J7 Pins 9 and 10, J6 Pins 1 and 2  
 10KHz Pins are on J6 Pins 3,4,5 and 6  
 100KHz Pins are on J6 Pins 7,8,9 and 10  
 Levels for 1MHz are on J5 Pins 1,2,3 and 4

Note: Levels will be same as in 100Hz sample chart as above, with pins taken in sequence listed.

For tens of MHz, J5 pin 9 is "High" for a reading of "1", and pin 8 is "High" for a reading of "2".

MEMORY IC

Levels noted on all pins including the supply rail for IC 1,2,3,4,5 and 6 are shown in the table below.

TEST CONDITIONS

1. Dial up a frequency of 12,345.6 MHz on the receiver, with memory unit connected.
2. Select CH1, depress button "A" and "preset" button.
3. Check levels per table below.

	<u>PINS</u>																					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>
IC1	L	L	L	H	L	H	H	L	H	H	L	L	H	H	H	H	L	L	H	L	H	
IC2	L	L	L	H	L	H	H	L	L	L	H	H	L	L	L	L	H	L	L	H	L	H
IC3	L	L	L	H	L	H	H	L	0	H	H	H	L	L	L	L	H	L	L	H	L	H
IC4	L	L	L	H	L	H	H	L	L	L	L	L	H	H	L	L	H	L	L	H	L	H
IC5	L	L	L	H	L	H	H	L	H	H	L	L	H	H	L	L	H	L	L	H	L	H
IC6	L	L	L	H	L	H	H	L	L	L	H	H	H	H	L	L	H	L	L	H	L	H

Levels for the three state buffer IC's, IC 9,10,11,12,13 and 14 are shown on the table below. Frequency reading on the receiver is 12,345.6 MHz.

	<u>PINS</u>													
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
IC9	H	H	H	H	L	L	L	H	H	H	H	H	H	H
IC10	H	L	L	H	H	H	L	L	L	H	L	L	H	H
IC11	H	H	0	H	H	H	L	L	L	H	L	L	H	H
IC12	H	L	L	H	L	L	L	H	H	H	L	L	H	H
IC13	H	H	H	H	H	L	L	H	H	H	L	L	H	H
IC14	H	L	L	H	H	H	L	H	H	H	L	L	H	H

COMPONENTS

1. Parts list for the NDH518 is appended.
2. Schematic diagram.
3. Block diagram.  
IC's specifications of the major IC used in the memory unit are also appended.

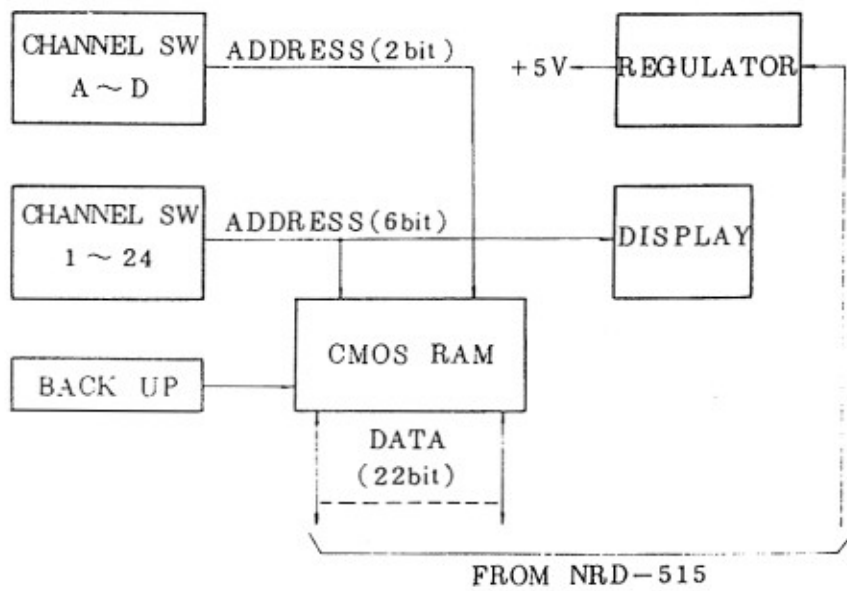
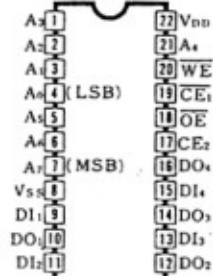


Fig. 1 Block diagram of NDH-518 Memory Unit

図 1 NDH-518 メモリユニット系統図

### 1K CMOS Static RAM(256×4) 5101

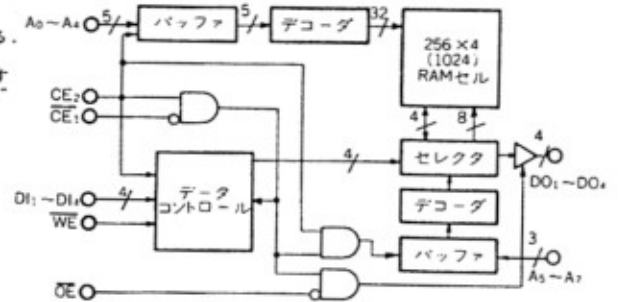
#### ●ピン接続



#### ●特徴

- ◎ 2101ピンコンパチブル。
- ◎ 入出力はTTLコンパチブル。
- ◎ データ非反転。
- ◎ CE<sub>2</sub>により、スタンバイモードになる。
- ◎ 低電圧データ保持は5101Lのみ。
- ◎ CE<sub>1</sub>によって、スタンバイモードにする時はすべての入力は“L”または“H”に固定しなければならない。

#### ●ブロック図



#### ●電源

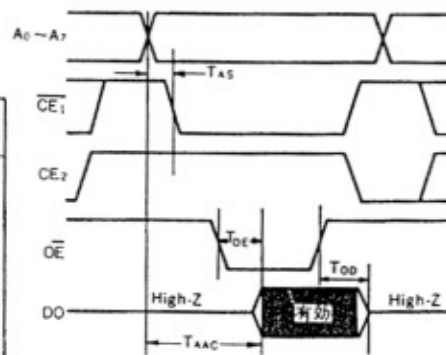
V<sub>DD</sub> : +5V Pin 22  
V<sub>SS</sub>(GND) Pin 8

#### ●動作表

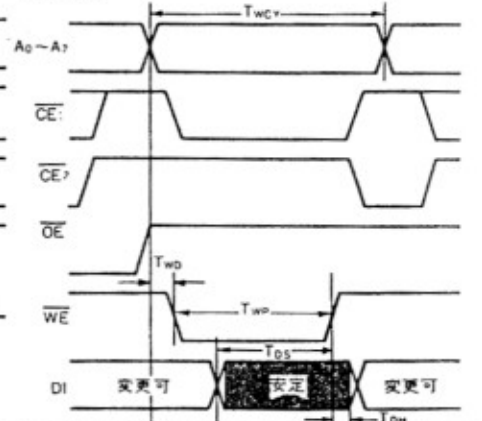
入 力				DO	動 作
CE <sub>1</sub>	CE <sub>2</sub>	OE	WE		
L	L	X	X	High-Z	Stand-by 非選択
H	L	X	X	High-Z	Stand-by 非選択
H	H	X	X	High-Z	Operating 非選択
L	H	L	H	有効	Operating Read
H	H	L	L	有効	Operating Write
H	H	H	H	High-Z	Operating Read
H	H	H	L	High-Z	Operating Write

#### ●波形

##### ●READ サイクル時間 = T<sub>AAC</sub>



##### ●WRITE



1K CMOS Static RAM (256×4) 5101

形 名	社 名	温度 範囲 (℃)	スイッチング特性								電 源			入力/測定電圧(V)			出力/測定電流(mA)			備 考		
			T <sub>AAC</sub> Max (nS)	T <sub>OM</sub> Min (nS)	T <sub>CAC</sub> Max (nS)	T <sub>OO</sub> Max (nS)	T <sub>WCY</sub> Min (nS)	T <sub>WO</sub> Min (nS)	T <sub>WP</sub> Min (nS)	T <sub>OS</sub> Min (nS)	T <sub>OW</sub> Min (nS)	V <sub>DD</sub> (V)	I <sub>DD</sub> Max (mA)	I <sub>DD</sub> SB (mA)	V <sub>IL</sub> Max (V)	V <sub>IH</sub> Min (V)	C <sub>i</sub> Max (pF)	V <sub>OL</sub> Max (V)	V <sub>OH</sub> Min (V)		C <sub>o</sub> Max (pF)	
S101-8	Intel	0	800		450	200	800	200	450	450	100	+4.75	30	0.5	0.65	2.2	8	0.4	2.4	12	パワーファンなし 保持 2.0-5.25V	
S101L		+70	650		350	150	650	150	400	400	100	+5.25	27	0.01	/	/		/	/			
S101L-1			450		250	130	450	130	250	250	50											
S101L-3			650		350	150	650	150	400	400	100			0.2								
TCS017P-1	東 芝	-30	650				650	50	300	300	50	+4.5	25	0.1	0.6	1.9	5	0.4	2.4	7	保持 2.0-5.5V	
TCS017P-2		+85	1000				1000	100	500	500	100	+5.5			/	/		/	/			
μPD5101C-E	日 電	0	800		350	200	800	200	400	400	50	+4.75	27	0.1	0.65	2.2	8	0.4	2.4	20	PI	
μPD5101LC		+70	650								+5.25			/	/		/	/				
μPD5101LC-1			450																			
HM435101	日 立	0	650		350	150	650	150	400	400	50	+4.75	27	0.015	0.65	2.2	8	0.4	2.4	12	Ce	
HM435101-1		+70	450		250	130	450	130	250	250	50	+5.25		/	/		/	/				
HM435101V			650		350	150	650	150	400	400	50		29	0.0075	0.8	2.2		/	/			
S5101	AMI	0	650																			
S5101-1		+70	450																			
S5101-3			650																			
S5101-8			800																			
S5101L			650																			
S5101L-1			450																			
S5101L-3			650																			
S5101L-8			800																			
TCS501P	東 芝	-30	400		250	130	450	130	250	250	50	+4.5	15	0.1	0.65	2.2	5	0.4	2.4	7	PI	
TCS501P-1		+85	600		350	150	650	150	400	400	100	+5.5			/	/	Typ	/	/	Typ		



PARTS LIST  
FOR  
MEMORY UNIT  
MODEL NDH-518

MARCH, 1982



*Japan Radio Co., Ltd.*



PARTS LIST

MEMORY UNIT

MODEL NDH-518

1. MEMORY CDD-206
2. DISPLAY CDE-162

The table lists parts in alphanumeric order of their reference designations "NO." (see abbreviations below), and provides the following information on each part:

- A. JRC code number.
- B. Type.
- C. Description of part.

**Ordering information**

To obtain replacement parts, address order or inquiry to our Japan Radio CO, LTD. Sales Offices. Identify parts by their JRC code number. To obtain a part that is not listed, included:

- A. Equipment model number.
- B. Equipment serial number.
- C. Description of the part.
- D. Function and location of the part.

**ABBREVIATIONS**

A	Assembly	MIC	Microphone
ANT	Antenna	MG	Motor generator
AR	Arrester	MP	Heat dissipating device (heatsink, etc.), mechanical part
AT	Attenuator	MR	Shunt, multiplier
B	Rotary machine	MT	Centering magnet
BEL	Bell	P	Plug
BT	Battery	PC	Printed circuit
BZ	Buzzer	I	Lamp
C	Fixed capacitor	IS	Lamp socket
CB	Circuit breaker	PU	Pick-up
CD	Rectifier, detector, diode, varistor	R	Fixed resistor, thermistor
CV	Variable capacitor	RS	Lead selector
D	Dynamotor	RV	Variable resistor
DC	Directional coupler	S	Switch, key, thermostat, interlock
DL	Delay line	SP	Speaker
E	Earth, ground	T	Transformer
F	Fuse	TB	Terminal board
FL	Filter	TC	Thermocoupler
FS	Fuse holder	TF	Tuning fork
G	Generator, vibrator	TP	Testpoint
HC	Hybrid circuit	TR	Transistor
HR	Thermostatic oven, heater	TRS	Transistor socket
HS	Handset	V	Electron tube
HT	Telephone receiver	VR	Voltage regulator
HY	Hybrid coil	VS	Electron tube socket
IC	Integrated circuit	W	Wire, cable, wave guide
J	Jack	X	Crystal
K	Relay	XD	Discriminator
KS	Relay socket	XS	Crystal socket
L	Inductor, coil	XU	Crystal oscillator
M	Meter	Z	Tuned cavity, pulse forming network, dummy

PARTS LIST

ORDER		TITLE		LIST NO.	SHEET NO.
		MEMORY		CDD-206	1
PART NO.	PART NAME	TYPE	DESCRIPTION	REMARKS	CODE
BTS1	BT HOLDER				6Z7AB01858
BTS2	BT HOLDER				6Z7AB01858
BTS3	BT HOLDER				6Z7AB01858
C1	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
5 C2	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C3	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C4	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C5	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C6	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
10 C7	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C8	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C9	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C10	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C11	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
15 C12	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C13	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C14	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C15	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C16	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
20 C17	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C18	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C19	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C20	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C21	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
25 C22	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C23	CAP, FXD CER	DD112SL102 J50V02	50V 1000PF		5CAAA01112
C24	CAP, FXD PLSTC	FCE-41H104KZ	0.1UF		5CEAA00123
C25	CAP, FXD CTLT	FL FCE-41ES100	25V10UF		5CEAA01348
C26	CAP, FXD CER	DD109E103P50V02	50V 10000PF		5CBAR00301
C27	CAP, FXD CER	DD109E103P50V02	50V 10000PF		5CBAR00301
C28	CAP, FXD CTLT	EL FCE-41ES100	25V10UF		5CEAA01348
C29	CAP, FXD CER	DD109E103P50V02	50V 10000PF		5CBAR00301
AWN C30	CAP, FXD CER	DD109E103P50V02	50V 10000PF		5CBAR00301
C31	CAP, FXD CTLT	FL FCE-41ES100	25V10UF		5CEAA01348
35 C32	CAP, FXD CER	DD109E103P50V02	50V 10000PF		5CBAR00301

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## PARTS LIST

ORDER		TITLE		LIST NO.	SHEET NO.
		MEMORY		CDD-206	2
PART NO.	PART NAME	TYPE	DESCRIPTION	REMARKS	CONF
C33	CAP, FXD CTLT	EL	ECE-A1ES100	25V10UF	5CEAA01349
C34	CAP, FXD CTLT	EL	ECE-A1ES101	25V100UF	5CEAA01349
C35	CAP, FXD CER		00112SL102J50V02	50V 1000PF	5CAAA01112
C36	CAP, FXD CER		00112SL102J50V02	50V 1000PF	5CAAA01112
5 C37	CAP, FXD CER		00112SL102J50V02	50V 1000PF	5CAAA01112
C04	DIODE		10D2	200V 1A	5TXAG00001
C05	DIODE		1S1588LB-10		5TXA000249
C06	DIODE		1S1588LB-10		5TXA000249
C07	DIODE		HZ3HC1		5TXAE00119
10 C08	DIODE		10D8		5TXAG00002
IC1	IC		UPD5101LC		5DDAC00151
IC2	IC		UPD5101LC		5DDAC00151
IC3	IC		UPD5101LC		5DDAC00151
IC4	IC		UPD5101LC		5DDAC00151
15 IC5	IC		UPD5101LC		5DDAC00151
IC6	IC		UPD5101LC		5DDAC00151
IC7	IC		HD74LS47P		5DDAF00390
IC8	IC		HD74LS47P		5DDAF00390
IC9	IC		SN74LS126AN		5DDAL00422
20 IC10	IC		SN74LS126AN		5DDAL00422
IC11	IC		SN74LS126AN		5DDAL00422
IC12	IC		SN74LS126AN		5DDAL00422
IC13	IC		SN74LS126AN		5DDAL00422
IC14	IC		SN74LS126AN		5DDAL00422
25 IC15	IC		TC4049BP		5DDAE00044
IC16	IC		TC4049BP		5DDAE00044
IC17	IC		HA17905P		5DAAG00067
J1	CONNECTOR		PCN6-20PA-2.5DS	20P	5JDA000749
J5	CONNECTOR		HNC2-2.5P-10DS	10P	5JDA000275
J6	CONNECTOR		HNC2-2.5P-10DS	10P	5JDA000275
J7	CONNECTOR		HNC2-2.5P-10DS	10P	5JDA000275
K1	RELAY		RF-HD-5V		5KLAB000039
RA L1	COIL		LF1-100K	10UH	5LCAB00001
P4	CONNECTOR		H-67CJ000012		6ZCJ000012
35 P5	CONNECTOR		HNC2-2.5S-10	10P	5JDA000277

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## PARTS LIST

ORDER		TITLE		LIST NO.	SHEET NO.
		MEMORY		CDD-206	3
PART NO.	PART NAME	TYPE	DESCRIPTION	REMARKS	CODE
P6	CONNECTOR	HNC2-2.5S-10	10P		5J04A00277
P7	CONNECTOR	HNC2-2.5S-10	10P		5J04A00277
PC1	PCR	MPPC08958			MPPC08958
R1	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5PZAB00029
5 R2	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5PZAB00029
R3	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5PZAB00029
R4	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5PZAB00029
R5	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5PZAB00029
R6	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5PZAB00029
10 R7	RESISTOR	IHR-1/8-4-471JB	1/8W 470 Ω HM X4		5RZAB00024
R8	RESISTOR	IHR-1/8-4-471JB	1/8W 470 Ω HM X4		5RZAB00024
R9	RESISTOR	IHR-1/8-4-471JB	1/8W 470 Ω HM X4		5RZAB00024
R10	RESISTOR	IHR-1/8-4-471JB	1/8W 470 Ω HM X4		5RZAB00024
R11	RESISTOR	ERD-25UJ471	1/4W 470 Ω HM		5PDA01337
15 R12	RESISTOR FXD	ERD-25UJ472	1/4W 4.7K OHM		5PDA01361
R13	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5RZAB00029
R14	RESISTOR	IHR-1/8-4-473JA	1/8W 47K Ω HM X4		5RZAB00029
R15	RESISTOR FXD	ERD-25UJ472	1/4W 4.7K OHM		5PDA01361
R16	RESISTOR FXD	ERD-25UJ473	1/4W 47K Ω HM		5PDA01385
20 R17	RESISTOR FXD	ERD-25UJ102	1/4W 1K Ω M		5PDA01345
R18	RESISTOR FXD	ERD-25UJ221	1/4W 220 Ω HM		5PDA01329
R19	RESISTOR FXD	ERD-25UJ471	1/4W 470 Ω HM		5PDA01337
R20	RESISTOR FXD	ERD-25UJ104	1/4W 100K OHM		5PDA01393
R21	RESISTOR FXD	ERD-25UJ105	1/4W 1M Ω M		5PDA01417
25 R22	RESISTOR FXD	ERD-25UJ105	1/4W 1M Ω M		5PDA01417
R23	RESISTOR FXD	ERD-25UJ330	1/4W 33 Ω M		5PDA01309
R24	RESISTOR FXD	ERD-25UJ473	1/4W 47K Ω HM		5PDA01385
R25	RESISTOR FXD	ERD-25UJ473	1/4W 47K Ω HM		5PDA01385
S1	SWITCH	H-6SSJD00014	5BITS L=30 MM		6SSJD00014
S2	SWITCH	H-6SCJD00015			6SCJD00015
S4	SWITCH	H-6SCJD00014			6SCJD00014
T#1	TRANSISTOR	2SC1815-Y			5TCAF00219
T#2	TRANSISTOR	2SC1815-Y			5TCAF00219

APPROVED

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PARTS LIST

ORDER		TITLE		LIST NO.	SHEET NO.
		DISPLAY	CDE-162		1
PART NO.	PART NAME	TYPE	DESCRIPTION	REMARKS	CODE
CD1	LED	TLR313			5TZA000003
CD2	LED	TLR313			5TZA000003
CD3	LED	TLG103	GREEN		5TZA000023
P1	CONNECTOR	PCN6-20S-2.50S			5J0AA00080
PC2	PCB	MPPC07987			MPPC07987

5

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15

20

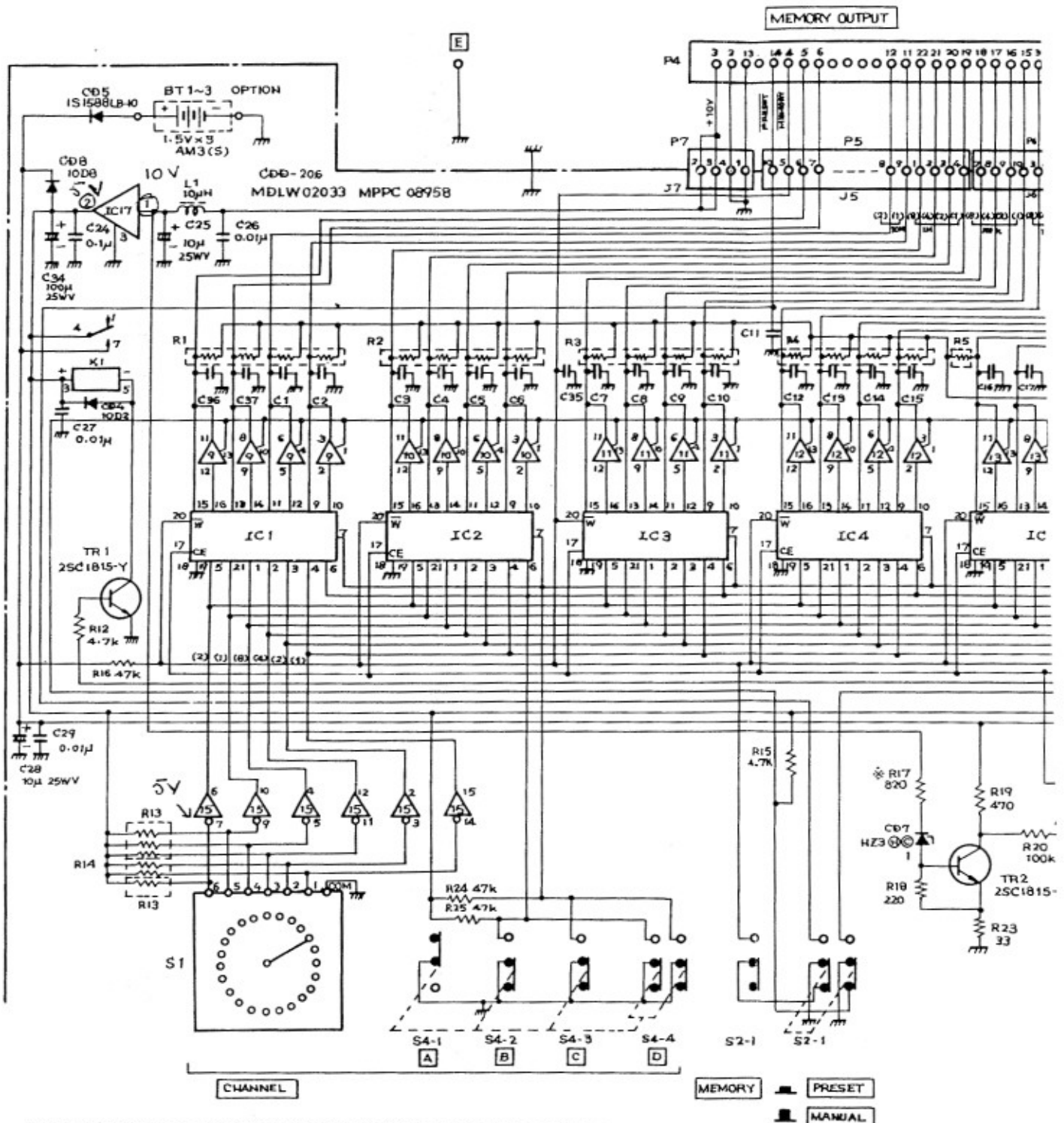
25

APPROVED

CHECKED

RAWN

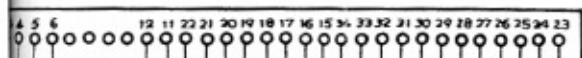
35



注 1) 特記外の抵抗は全てΩおよび1/4Wを示し、容量はpFを示す。  
 2) ※印は調整用部品を示す。

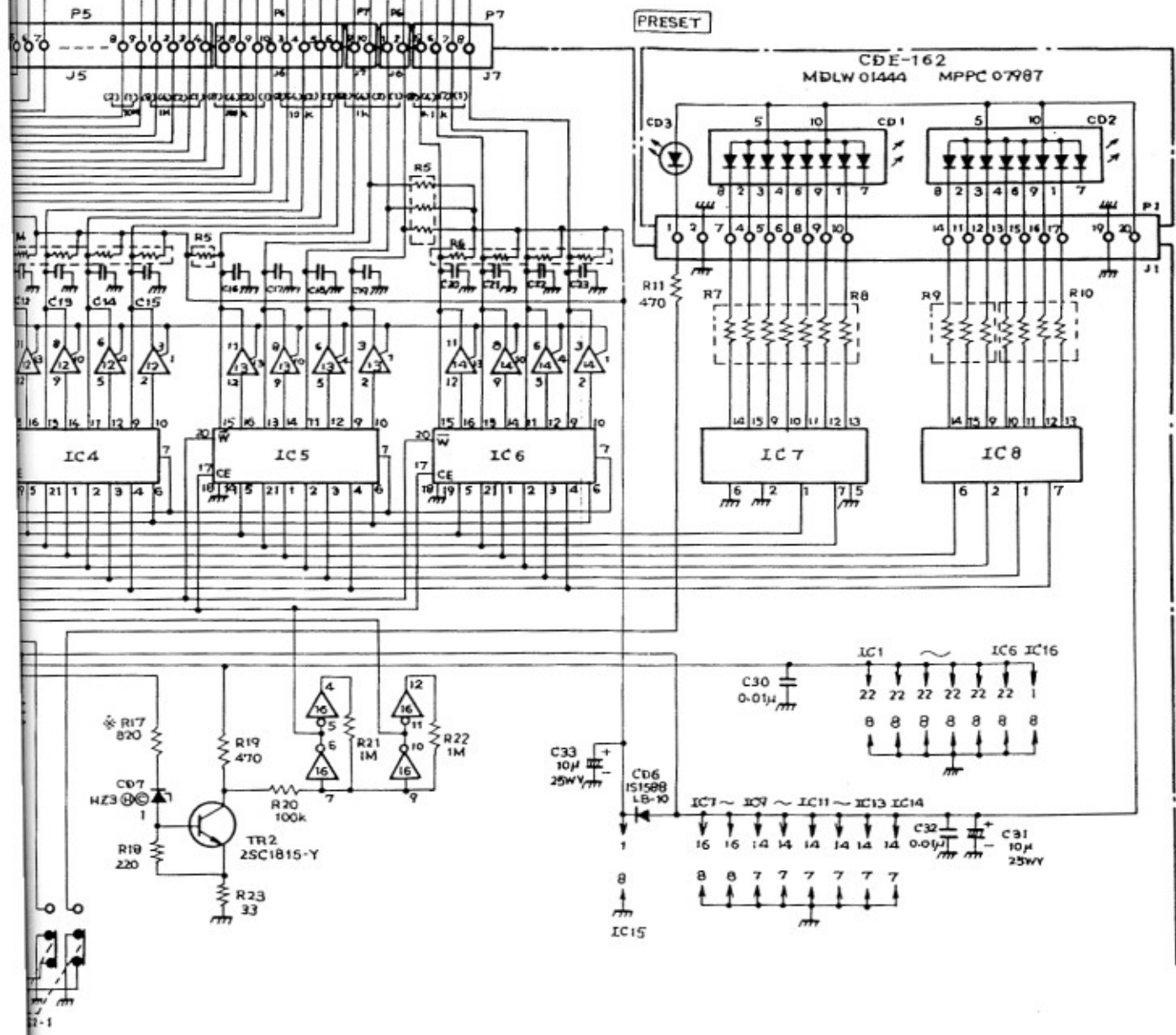
NOTES 1. UNLESS OTHERWISE INDICATED RESISTANCES ARE IN OHMS CAPACITANCES ARE IN MICRO-MICRO FRAED  
 2. \* VALUES SELECTED IN MANUFACTURE.

MEMORY OUTPUT



- C1 ~ C23, C35 ~ C37: 0.001 $\mu$
- R1 ~ R6, R13, R14: 47k $\times$ 4
- R7 ~ R10: 470 $\times$ 4
- CD1, CD2: TLR 313
- CD3: TLG 103

IC1 ~ IC6	$\mu$ PD5101LC
IC7, IC8	SN74LS47N
IC9 ~ IC14	SN74LS126AN
IC15, IC16	TC4049 BP
IC17	HA17805 P



PRESET  
MANUAL

付図 1  
APPENDIX 1

NDH-518  
メモリユニット接続図  
MEMORY UNIT SCHEMATIC DIAGRAM

RESISTOR VALUES ARE IN MICRO-MICRO FRADS.