

Model name:

BMS-IFMB0TLR-E

MB Interface

Modbus RTU (RS-485) Interface
for Toshiba AIR-CONDITIONER

User Manual
Issue Date: 26/03/2018

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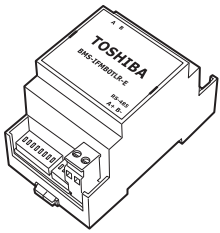
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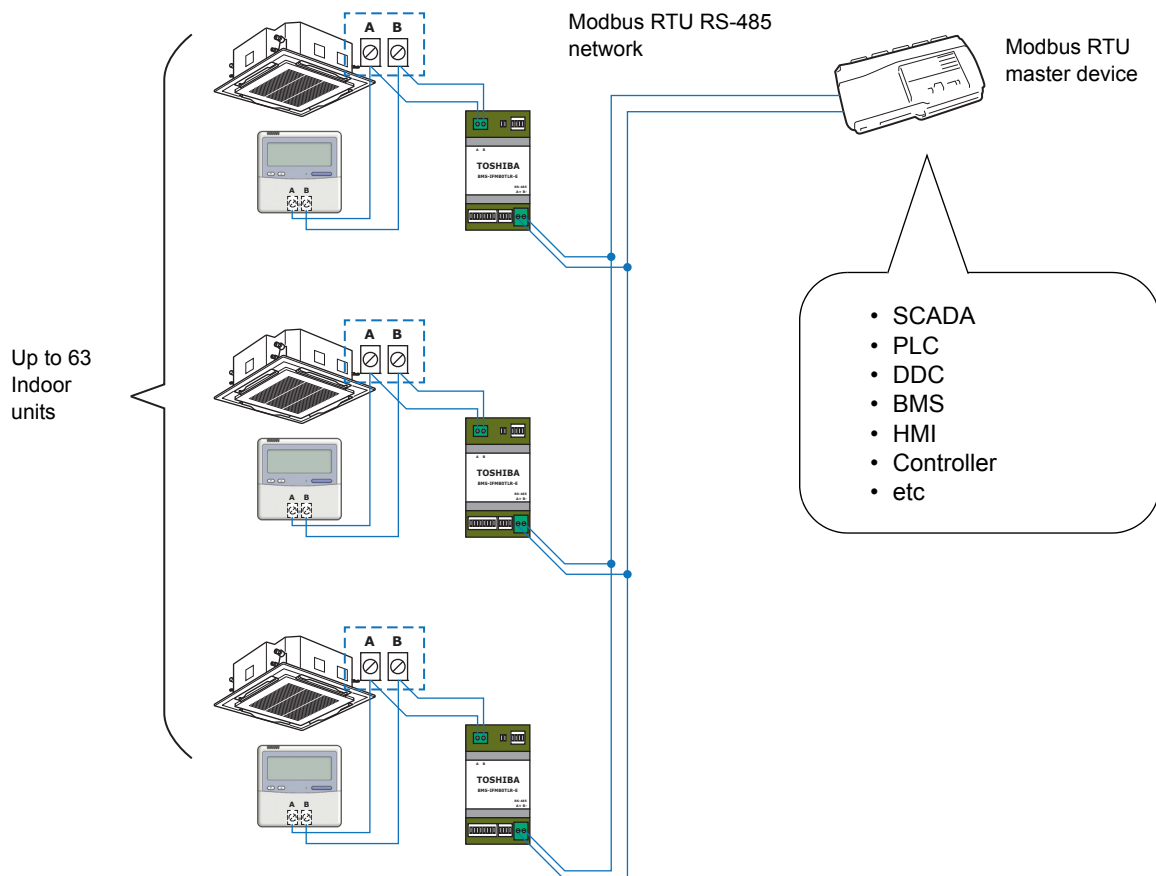
1. Presentation



The BMS-IFMB0TLR-E interface allows a complete and natural integration of Toshiba air conditioners into Modbus RTU (RS-485) networks.

The BMS-IFMB0TLR-E is compatible with the Toshiba Remote controller AB lines.

- Reduced dimensions. 90(93) x 53 x 58 mm.
- Quick and easy installation.
Mountable on DIN rail, wall
- External power not required.
- Direct connection to Modbus RTU (RS-485) networks.
BMS-IFMB0TLR-E is a Modbus slave device.
- Direct connection to the Indoor unit.
- Configuration from both on-board DIP-switches and Modbus RTU.
- Total Control and Supervision.
- Allows using simultaneously the Remote Controller and Modbus RTU.



2. Installation instructions

- Disconnect the Air-conditioning from Mains Power.
- Fix the interface beside the Air-conditioning (wall mounting) following the instructions in the diagram below or install it inside the Air-conditioning (respect the safety instructions given above).
- Connect the interface to A B bus in any point of the bus. The A B bus is the bus that connects the Indoor unit and the wired remote controller, is a two-wire bus connecting terminals A B of both, this A B connection has no specific polarity.
- Connect the RS-485 bus to the connector RS-485 of the interface.
- Close the Indoor unit and reconnect it to Mains Power.
- Follow the instructions on the user manual for configuring and commissioning the interface.
- Follow the instructions of the next page to configure the interface through on-board DIP-switches.

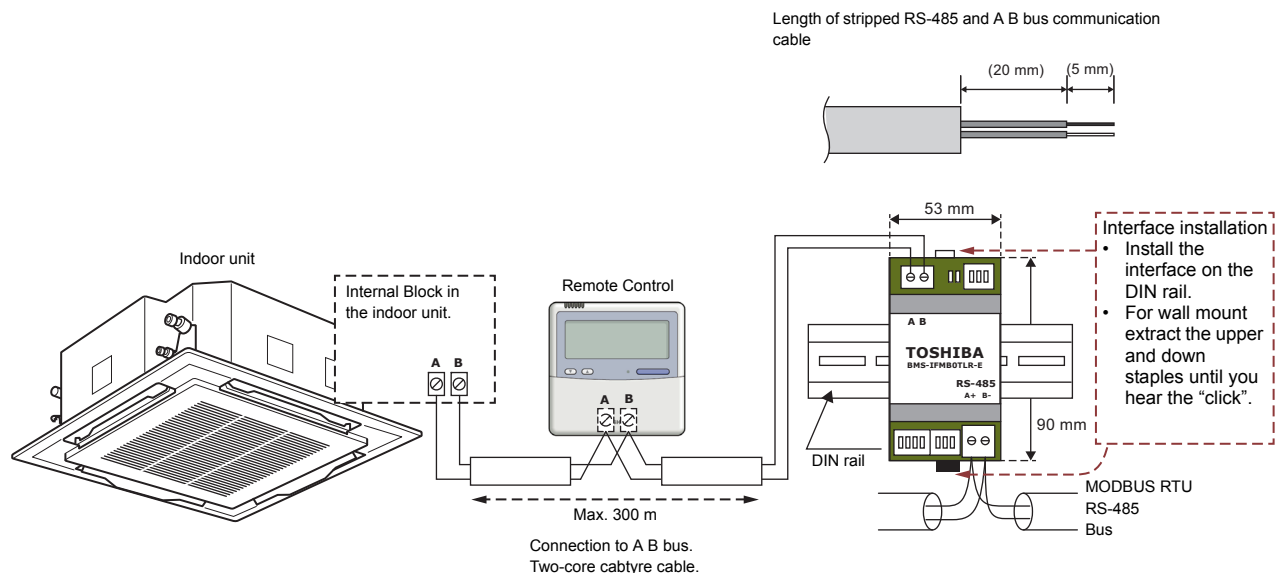
NOTE

The cable used for connection of BMS-IFMB0TLR-E to A B bus can be any two-core cable, the maximum distance for bus A B is 300 meters, consult the manual of the Air-conditioning for more details.

Respect the maximum distance of 500 meters for the bus, no loop or star topologies are allowed for RS-485 bus, a terminator resistor of 120 Ω must be present at each end of the bus to avoid signal reflections and also a fail-safe biasing mechanism.

IMPORTANT:

- Use only one remote controller. A sub-remote controller cannot be connected when connecting this interface.



NOTE

In its place there is a pair of cables to connect the Remote Controller. Use these cables to connect the AB bus. Check your Air-Conditioning user or service manual for more information.

3. Modbus Interface Specification

3.1 Modbus physical layer

BMS-IFMB0TLR-E implements a Modbus RTU (slave) interface, to be connected to an RS-485 line. It performs 8N2 (8N1-compatible) communication (8 data bits, no parity and 2 stop bit) with several available baud rates (2400 bps, 4800bps, 9600 bps -default-, 19200 bps).

The relationship between the start address specified in a request from the master device and the value shown by “Modbus-address for registers” in the address assignment table is as follows:

For Holding Register

Start address = (Value of Modbus-address for registers) – 40001

3.2 Modbus Registers for Standard Functions

All registers are of type “16-bit signed Holding Register”, in standard Modbus’ big endian notation.

3.2.1 Indoor Unit Control and Status Registers

Addr	R/W	Item	
40001	R/W	AC On/Off	0-OFF, 1-ON
40002	R/W	Operation mode	1-HEAT 2-COOL 3-FAN 4-DRY, 5-AUTO-HEAT (Enabled only for supported models) 6-AUTO-COOL (Enabled only for supported models)
40003	R/W	Setpoint temperature	°C *1, *2
40004	R/W	Auto-Cooling setpoint temperature	°C *1, *2 (Enabled only for models that support dual setpoint)
40005	R/W	Auto-Heating setpoint temperature	°C *1, *2 (Enabled only for models that support dual setpoint)
40006	R/W	Fan speed	2-AUTO 3-HH 4-H 5-L 6-LL (Read Only) 7-H+ (Enabled only for models with support for five fan speeds) 8-L+ (Enabled only for models with support for five fan speeds)
40007	R/W	Louver	1-Swing 2-F1 3-F2 4-F3 5-F4 6-F5 7-Stop
40008	R/W	4-way Louver No.1	Same as the above (Enabled only for 4-way indoor units)
40009	R/W	4-way Louver No.2	Same as the above (Enabled only for 4-way indoor units)

Addr	R/W	Item	
40010	R/W	4-way Louver No.3	Same as the above (Enabled only for 4-way indoor units)
40011	R/W	4-way Louver No.4	Same as the above (Enabled only for 4-way indoor units)
40012	R/W	Permit/Prohibit of local	'permit' bits [xxxx xxxx xxxx xSMO], where O-On/Off M-Operation Mode S-Setpoint temp
40013	R/W	Filter sign / Filter sign reset	0-Normal, 1-Filter Sign
40014	R/W	Soft Cooling On/Off	0-OFF, 1-ON
40015	R/W	Save Operation (steps)	0-No Save (100% operation) 1-XX% Save (100-50%), 2-50% Save (50%) 3-100% Save (Forcibly Thermo OFF)
40016	R/W	Ventilation On/Off	0-OFF, 1-ON
40017	R/W	Ventilation Mode	1-Bypass 2-Heat Exchange 3-Automatic
40018	R/W	Ventilation air volume	2-H 3-L 4-Imbalance (Only models with imbalance enabled)
40019	R	Alarm Status	0-No alarm condition 1-Alarm condition
40020	R	Alarm Code	0 - 255 (Refer to Section 6) (-1)-communication error (-3)-paused (-4)-initialization (-5)-Low-power-consumption mode
40021	R	Alarm Address	0x00 Interface 0x40 Remote controller 0x** Indoor Unit(s)
40022	R	Control temperature	°C *1, *2
40023	R	Thermo. Sensor (TA-sensor)	°C *1, *2
40024	R	Thermo. Sensor (TF-sensor)	°C *1, *2
40025	R	Operation Stand-by	0-OFF, 1-ON
40026	R	Heating Stand-by	0-OFF, 1-ON
40027	R	Frost Protect Function Setting	0-OFF, 1-ON
40028	R	Night Low Noise Operation	0-OFF, 1-ON
40030	R	Clean Operation	0-OFF, 1-ON
40031	R	Frost Protect Function Status	0-OFF, 1-ON
40033	R	Save Operation (On/Off)	0-OFF, 1-ON
40034	R	Demand Response Status	0-No Demand (100% operation) 1-XX% Demand (100-50%) 2-50% Demand (50%) 3-100% Demand (Forcibly Thermo OFF)
40035	R	Multi-Tenant Control Status	0-OFF, 1-ON
40036	R	Nigh Purge Status	0-OFF, 1-ON
40037	R	24 Hours Operation	0-OFF, 1-ON
40038	R	Ventilation Stand-by	0-OFF, 1-ON
40039	R	Central Control Address	1 to 64 *3

(*1) Temperature data °C x1 (S4 Bit1 OFF) / x10°(S4 Bit1 ON)

(*2) Temperature Read data 0x8000 means No Sensor or Sensor Error.

(*3) If a central control address is not set, the value will be 0x8000.

3.2.2 Indoor Unit Setting Status

Addr	R/W	Item	
40201	R	Cooling Upper limit Setting Temperature (MAX)	°C *1
40202	R	Cooling Lower limit Setting Temperature (MIN)	°C *1
40203	R	Heating Upper limit Setting Temperature (MAX)	°C *1
40204	R	Heating Lower limit Setting Temperature (MIN)	°C *1
40205	R	Dry Upper limit Setting Temperature (MAX)	°C *1
40206	R	Dry Lower limit Setting Temperature (MIN)	°C *1
40207	R	Auto Upper limit Setting Temperature (MAX)	°C *1
40208	R	Auto Lower limit Setting Temperature (MIN)	°C *1
40209	R	Operation Mode Permit / Prohibit	0-ALL mode prohibit, 'Permit' bits [xxxx xxxx xxAx HDCF], where A=Auto, H=Heat, D=Dry, C=Cool, F=Fan
40210	R	Fan Speed Setting Range	0-ALL Fan speed invalid, 'Valid' bits [xxxx xxxx x65A 4321], where 1=LL, 2=L, 3=H, 4=HH, A=Auto, 5=L+, 6=H+
40211	R	Ventilation On/Off Setting Status	0-Invalid, 1-Valid
40212	R	Ventilation Mode Setting Status	0-ALL Ventilation mode invalid, 'Valid' bits [xxxx xxxx xxxx xAHB], where A=Automatic, H=Heat Exchange, B=Bypass
40213	R	Ventilation Air Volume Setting Status	0-ALL Ventilation air volume invalid, 'Valid' bits [xxxx xxxx xxxx xUHL], where U=Unbalance, H=High, L=Low
40214	R	Dual Set Point Function Status	0-Invalid, 1-Valid
40215	R	Soft Cooling Function Status	0-Invalid, 1-Valid
40216	R	Fan 5 Speed Function Status	0-Invalid, 1-Valid
40217	R	Save Function Status	0-Invalid, 1-Valid
40218	R	Louver Function Status	0-Invalid, 1 or more- Valid

(*1) Temperature data °C x1 (S4 Bit1 OFF) / x10°(S4 Bit1 ON)

3.2.3 Configuration Registers

Addr	R/W	Item	
40041	R	Modbus baud rate	0-2400bps 1-4800bps 2-9600bps 3-19200bps
40042	R	Modbus Slave Address	1 to 63
40050	R	Device Definition	0x2800
40051	R	Software Version	

3.2.4 Implemented Functions

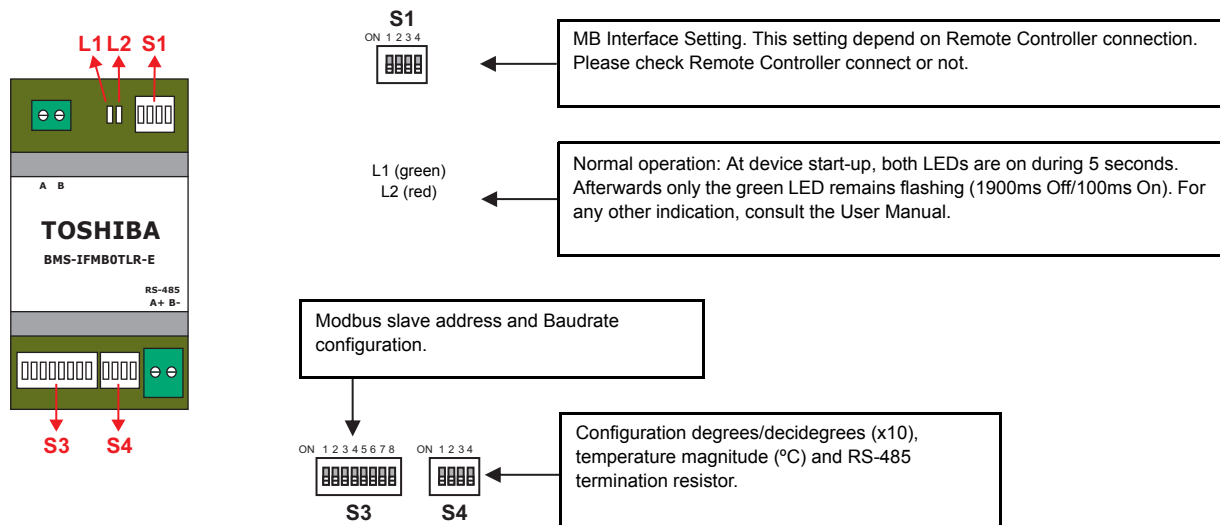
BMS-IFMB0TLR-E implements the following standard Modbus functions:

- 3: Read Holding Registers
- 6: Write Single Register
- 16: Write Multiple Registers (Although this function is allowed, the interface does not allow write operations on more than 1 register with the same request, this means that length field should always be 1 when using this function for writes)

3.3 Configuration through micro switches

All configuration values on BMS-IFMB0TLR-E can be written and read from Modbus interface. Though, some of them can also be setup from its on-board DIP-switch interface.

They are DIP-switches S1*, S3* and S4 on the device, in the following location:



The following table applies for configuration of the interface through these DIP-switches:

S1 - MB Interface Setting

Switches 1 2 3 4	Description
↓ x x x	Connet Wired Remote Controller and/or Wireless Remote Controller (default setting)
↑ x x x	Not Connet Wired Remote Controller and Wireless Remote Controller.
x ↑ x x	Reserve.
x x ↑ x	Reserve.
x x x ↑	Reserve.

S3 - Modbus slave address and baudrate

Add	Switches						Add	Switches						Add	Switches												
	1	2	3	4	5	6		1	2	3	4	5	6		1	2	3	4	5	6							
0	↓	↓	↓	↓	↓	↓	16	↓	↓	↓	↓	↑	↓	32	↓	↓	↓	↓	↓	↑	48	↓	↓	↓	↓	↑	↑
1*	↑	↓	↓	↓	↓	↓	17	↑	↓	↓	↓	↑	↓	33	↑	↓	↓	↓	↓	↑	49	↑	↓	↓	↓	↑	↑
2	↓	↑	↓	↓	↓	↓	18	↓	↑	↓	↓	↑	↓	34	↓	↑	↓	↓	↓	↑	50	↓	↑	↓	↓	↑	↑
3	↑	↑	↓	↓	↓	↓	19	↑	↑	↓	↓	↑	↓	35	↑	↑	↓	↓	↓	↑	51	↑	↑	↓	↓	↑	↑
4	↓	↓	↑	↓	↓	↓	20	↓	↓	↑	↓	↑	↓	36	↓	↓	↑	↓	↓	↑	52	↓	↓	↑	↓	↑	↑
5	↑	↓	↑	↓	↓	↓	21	↑	↓	↑	↓	↑	↓	37	↑	↓	↑	↓	↓	↑	53	↑	↓	↑	↓	↑	↑
6	↓	↑	↑	↓	↓	↓	22	↓	↑	↑	↓	↑	↓	38	↓	↑	↑	↓	↓	↑	54	↓	↑	↑	↓	↑	↑
7	↑	↑	↑	↓	↓	↓	23	↑	↑	↑	↓	↑	↓	39	↑	↑	↑	↓	↓	↑	55	↑	↑	↑	↓	↑	↑
8	↓	↓	↓	↑	↓	↓	24	↓	↓	↓	↑	↑	↓	40	↓	↓	↓	↑	↓	↑	56	↓	↓	↓	↑	↑	↑
9	↑	↓	↓	↑	↓	↓	25	↑	↓	↓	↑	↑	↓	41	↑	↓	↓	↑	↓	↑	57	↑	↓	↓	↑	↑	↑
10	↓	↑	↓	↑	↓	↓	26	↓	↑	↓	↑	↑	↓	42	↓	↑	↓	↑	↓	↑	58	↓	↑	↓	↑	↑	↑
11	↑	↑	↓	↑	↓	↓	27	↑	↑	↓	↑	↑	↓	43	↑	↑	↓	↑	↓	↑	59	↑	↑	↓	↑	↑	↑
12	↓	↓	↑	↑	↓	↓	28	↓	↓	↑	↑	↑	↓	44	↓	↓	↑	↑	↓	↑	60	↓	↓	↑	↑	↑	↑
13	↑	↓	↑	↑	↓	↓	29	↑	↓	↑	↑	↑	↓	45	↑	↓	↑	↑	↓	↑	61	↑	↓	↑	↑	↑	↑
14	↓	↑	↑	↑	↓	↓	30	↓	↑	↑	↑	↑	↓	46	↓	↑	↑	↑	↓	↑	62	↓	↑	↑	↑	↑	↑
15	↑	↑	↑	↑	↓	↓	31	↑	↑	↑	↑	↑	↓	47	↑	↑	↑	↑	↓	↑	63	↑	↑	↑	↑	↑	↑

* Default value

Switches 7 8	Description
↓ ↓	2400bps
↑ ↓	4800bps
↓ ↑	9600bps (default value)
↑ ↑	19200bps

S4 - Degrees/Decidegrees (x10), temperature magnitude (°C) and RS-485 termination resistor

Switches 1 2 3 4	Description
↓ x x x	Temperature values in Modbus register are represented in degrees (x1) (default value)
↑ x x x	Temperature values in Modbus register are represented in decidegrees (x10)
x x x ↓	RS-485 bus without termination resistor (default value)
x x x ↑	Internal termination resistor of 120Ω connected to RS-485 bus *

* Only in the interfaces conected at both ends of the bus must be activated the termination resistor, not in the rest. The RS-485 bus can be biased through internal jumpers JP2 and JP3. Consult the user manual for details.

3.4 Device LED indicator

The device includes two LED indicators to signal its different possible operational states. In this section their meaning is explained

L1 (yellow)			
Operation	ON	OFF	Meaning
Blinking	500 ms	500 ms	Communication error
Flashing	100 ms	1900 ms	Normal operation (configured and working)
L1 (green) & L2 (red)			
Operation	ON	OFF	Meaning
Pulse	5 sec	--	Device start-up
Alternate blinking	500 ms	500 ms	EEPROM failure

3.5 RS-485 bus. Termination resistors and Fail Safe Biasing mechanism

RS-485 bus requires a 120Ω terminator resistor at each end of the bus to avoid signal reflections.

In order to prevent fail status detections by the receivers "listening" the bus when all the transmitters outputs are in three-state (high impedance), it is also required a fail-safe biasing mechanism. This mechanism provides a safe status (a correct voltage level) in the bus when all the transmitters' outputs are in three-state.

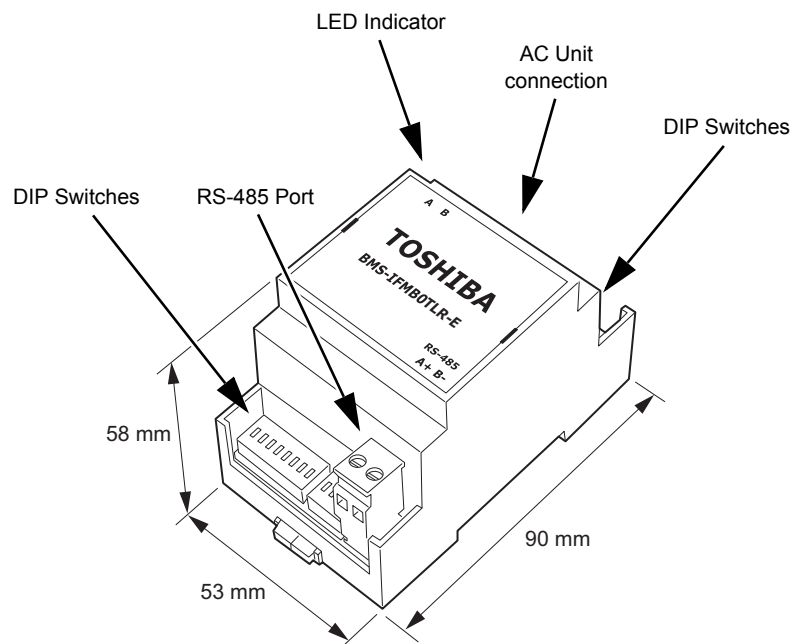
The BMS-IFMB0TLR-E device includes an on-board terminator resistor of 120Ω that can be connected to the RS-485 bus by using DIP-switch S4 Bit4, ON : 120Ω, OFF : without terminal register.

Fail safe biasing of the RS-485 bus must only be supplied by one of the devices connected to the bus. The device providing fail safe biasing or terminator resistor should be the one connected at one end of the bus. At the other end of the bus, if there is also a BMS-IFMB0TLR-E device, select the 120Ω terminator resistor through DIP-switch P5, or if there is a master device not providing internal 120Ω terminator resistor, connect an external 120Ω resistor in the bus terminal block connection of such master device.

Some Modbus RTU RS-485 master devices can provide also internal 120Ω terminator resistor and/or fail safe biasing (consult the technical documentation of the master device connected to the RS-485 network in every case).

4. Specifications

Dimensions:	90(93) x 53 x 58 mm
Weight:	85 g
Operating Temperature:	0 . . . 40°C
Stock Temperature:	0 . . . 40°C
Operating Humidity:	<95% RH, non-condensing
Stock Humidity:	<95% RH, non-condensing
Isolation voltage:	1500 VDC
Isolation resistance:	1000 MΩ
Modbus Media:	Compatible with Modbus RTU – RS-485 networks



5. Precautions

5.1 Restrictions for Use in Combination with Wired Remote Controller

When use RBC-AMS5* Remote Controller, You cannot connect the following air-conditioner.

Type	Model
1-way Air Discharge Cassette Type	MMU-AP***4YH1
Concealed Duct High Static Pressure Type	MMD-AP***4H,-E
Floor Standing Concealed Type	MML-AP***4BH1,-E
Floor Standing Cabinet Type	MML-AP***4H1,-E
Floor Standing Type	MMF-AP***4H,-E
Fresh Air Intake Indoor unit Type	MMD-AP***1HFE
Air to Air Heat exchanger with DX-coil Type	MMD-VN***2HEX1E
Hot Water Module	MMW-AP****LQ-*

5.2 *When Remote Controller Not Installed*

Set bit 1 of the S1 switch of TCB-IFMB0TLR-E to ON and then supply power to the indoor unit.
In the case of a wall mounted model, there is no remote controller so bit 1 of the S1 switch needs to be ON.

Example

- Wired Remote Controller (sold separately) is not installed.
- Receiver unit of wireless remote controller (sold separately) is not installed.
- Indoor unit is wall mounted type

5.3 *“Permit/Prohibit of local” Setting*

If the power of an indoor unit is interrupted after “Prohibit of local” is set, the setting of the indoor unit becomes “Permit of local” so set “Prohibit of local” again.

5.4 *Louver Setting*

If the louver of an indoor unit is set from the TCB-IFMB0TLR-E, the master device and slave device will be set to the same louver setting. The same applies in the case of a 4-way louver.

5.5 *Auto-Cooling/Auto-Heating setpoint*

If auto-cooling setpoint \geq auto-heating setpoint, the setting values of auto-cooling setpoint and auto-heating setpoint are transmitted to an indoor unit. If auto-cooling setpoint $<$ auto-heating setpoint, they are disabled.

5.6 *When Value of Alarm Code Continues to Be (-4)-initialization*

If communication with the outdoor unit is not possible when power is supplied to an indoor unit, the alarm status of the TCB-IFMB0TLR-E will be 1-Alarm, and the alarm code may continue to be (-4)-initialization. Supply power to the outdoor unit. When the value of the alarm code is (-4)-initialization, even if the value of the Modbus register (40001 to 40018) is changed, the command to change the operation state will not be transmitted to the indoor unit.

6. Check Code

Check code		Alarm Unit	Alarm Description
Hexadecimal Number	Remote Controller Display		
00	A00	-	No error
01	A01	Indoor unit	Flow switch operation error
02	A02	Indoor unit	Water temperature decrease error
04	A04	Indoor unit	Activation of water heat exchanger frost protection
06	A06	Indoor unit	Ignition failed
1B	A27	Indoor unit	Abnormal increase at temperature sensor for refrigerant heating outlet
1C	A28	Indoor unit	Other thermal component error
25	C05	-	Sending error in TCC-LINK central control device
26	C06	-	Receiving error in TCC-LINK central control device
2C	C12	-	Batch alarm of general-purpose interface
2F	C15	-	Error codes for thermal storage unit
41	E01	Remote controller	Communication error between indoor and remote controller
42	E02	Remote controller	Sending error of remote controller
43	E03	Indoor unit	Communication error between indoor and remote controller
44	E04	Indoor unit	Communication circuit error between indoor and outdoor
46	E06	Outdoor unit	Decrease of No. of indoor units
47	E07	Outdoor unit	Communication circuit error between indoor/outdoor
48	E08	Indoor unit Outdoor unit	Duplicated indoor addresses
49	E09	Remote controller	Duplicated master remote controllers
4A	E10	Indoor unit	Communication error between indoor P.C.board
4B	E11	Outdoor unit	Communication error at optional PCB in indoor unit
4C	E12	Outdoor unit	Automatic address start error
4D	E13	Indoor unit	Periodic communication error (DX-kit -> 0 - 10 V I/F) at indoor unit <-> 0 - 10 V interface
4E	E14	Indoor unit	Periodic communication error between indoor unit and 0 to 10 V interface
4F	E15	Outdoor unit	No indoor automatic address
50	E16	Outdoor unit	Capacity over/No. of connected indoor units
51	E17	Indoor unit	Bad reception from flow selector (FS) unit
52	E18	Indoor unit	Communication error between indoor header and follower units
53	E19	Outdoor unit	Outdoor header units quantity error
54	E20	Outdoor unit	Other line connected during automatic address
55	E21	Outdoor unit	Header thermal storage units quantity error
56	E22	Outdoor unit	Decrease of No. of thermal storage units
57	E23	Outdoor unit	Sending error in communication between outdoor units
59	E25	Outdoor unit	Duplicated follower outdoor address
5A	E26	Outdoor unit	Decrease of No. of connected outdoor units
5C	E28	Outdoor unit	Follower outdoor unit error
5F	E31	Outdoor unit	IPDU communication error

Check code		Alarm Unit	Alarm Description
Hexadecimal Number	Remote Controller Display		
61	F01	Indoor unit	Indoor TCJ sensor error
62	F02	Indoor unit	Indoor TC2 sensor error
63	F03	Indoor unit	Indoor heat exchanger temperature sensor (TC1) error
64	F04	Outdoor unit	TD1 sensor error
65	F05	Outdoor unit	TD2 sensor error
66	F06	Outdoor unit	TE1/TE2 sensor error
67	F07	Outdoor unit	TL sensor error
68	F08	Outdoor unit	TO sensor error
69	F09	Outdoor unit	TG sensor error
6A	F10	Indoor unit	Indoor TA/TSA sensor error
6B	F11	Indoor unit	Indoor TF/TFA sensor error
6C	F12	Outdoor unit	TS1 sensor error
6D	F13	Outdoor unit	TH sensor error
6E	F14	Outdoor unit	TR sensor error
6F	F15	Outdoor unit	Outdoor temp. sensor misconnection (TE1/TL)
70	F16	Outdoor unit	Outdoor pressure sensor misconnection (Pd/Ps)
71	F17	Indoor unit	TOA sensor error
72	F18	Indoor unit	TRA sensor error
73	F19	Indoor unit	Indoor heat exchanger temperature sensor (TF) error
74	F20	Outdoor unit	PL (fluid piping pressure) sensor error
76	F22	Outdoor unit	TD3 sensor error
77	F23	Outdoor unit	Ps sensor error
78	F24	Outdoor unit	Pd sensor error
79	F25	Indoor unit	Indoor heat exchanger temperature sensor (TA) error
7A	F26	Indoor unit	Indoor heat exchanger temperature sensor (TC2) error
7D	F29	Indoor unit	Indoor other error
7E	F30	Indoor unit	Occupancy sensor error
7F	F31	Outdoor unit	Outdoor EEPROM error
81	H01	IPDU	Compressor break down
82	H02	IPDU	Magnet switch / Overcurrent operation / Compressor error
83	H03	IPDU	Current detection circuit error
84	H04	Outdoor unit	Comp-1 case thermo operation
85	H05	Outdoor unit	Outdoor temp. sensor misconnection (TD1)
86	H06	Outdoor unit	Low pressure protective operation
87	H07	Outdoor unit	Low oil level protection
88	H08	Outdoor unit	Oil level temp. sensor error
8E	H14	Outdoor unit	Comp-2 case thermo operation
8F	H15	Outdoor unit	Outdoor temp. sensor misconnection (TD2)
90	H16	Outdoor unit	Oil level circuit / Magnet switch / Overcurrent error
99	H25	Outdoor unit	Outdoor temp. sensor misconnection (TD3)
A1	J01	Indoor unit	Flow selector (FS) unit has bad reception from indoor unit (main unit)
A3	J03	Indoor unit	Flow selector (FS) unit is duplicated

Check code		Alarm Unit	Alarm Description
Hexadecimal Number	Remote Controller Display		
AA	J10	Indoor unit	Float SW operating at flow selector (FS) unit
AB	J11	Indoor unit	TCS sensor error in flow selector (FS) unit
AC	J12	Indoor unit	Sensor 2 error in flow selector (FS) unit
C2	L02	Indoor unit	Inconsistency error of outdoor units
C3	L03	Indoor unit	Duplicated indoor header units
C4	L04	Outdoor unit	Duplicated outdoor line address
C5	L05	Outdoor unit	Duplicated indoor units with priority
C6	L06	Outdoor unit	Duplicated indoor units with priority
C7	L07	Indoor unit	Group line in individual indoor unit
C8	L08	Indoor unit	Indoor group/Address unset
C9	L09	Indoor unit	Indoor capacity unset
CA	L10	Outdoor unit	Outdoor capacity unset
CC	L12	Indoor unit	Flow selector system error
D1	L17	Outdoor unit	Inconsistency error of outdoor units
D2	L18	Indoor unit	FS unit error
D4	L20	Indoor unit	Duplicated central control addresses
D5	L21	Indoor unit	200 V applied voltage error
D6	L22	Indoor unit	There are units in the group that do not support DX-KIT.
D7	L23	Outdoor unit	Setting abnormality
D8	L24	Indoor unit	Flow selector unit is set incorrectly
DA	L26	Indoor unit	Over No. of conneced thermal strage units
DB	L27	Indoor unit	Thermal storage units quantity error
DC	L28	Outdoor unit	Maximum number of outdoor units exceeded
DD	L29	Outdoor unit	No. of IPDU error
DE	L30	Indoor unit	Auxiliary interlock in indoor unit
DF	L31	Outdoor unit	IC error
E1	P01	Indoor unit	Indoor fan motor error
E2	P02	Indoor unit	Boost circuit error
E3	P03	Outdoor unit	Discharge temp. TD1 error
E4	P04	IPDU	High-pressure switch detection error
E5	P05	Outdoor unit	Phase-missing detection / Phase order error
E7	P07	Outdoor unit IPDU	Heat sink overheat error
E8	P08	Indoor unit	Intake air temperature error
EA	P10	Indoor unit	Indoor overflow error
EC	P12	Indoor unit	Indoor fan motor error
ED	P13	Outdoor unit	Outdoor liquid back detection error
EF	P15	Outdoor unit	Gas leak detection
F1	P17	Outdoor unit	Discharge temp. TD2 error
F2	P18	Outdoor unit	Discharge temp. TD3 error
F3	P19	Outdoor unit	4-way valve inverse error
F4	P20	Outdoor unit	High-pressure inverse error
F6	P22	IPDU	Outdoor fan IPDU error

Check code		Alarm Unit	Alarm Description
Hexadecimal Number	Remote Controller Display		
FA	P26	IPDU	G-Tr short circuit protection error
FD	P29	IPDU	Comp position detection circuit error
FE	P30	Indoor unit	Group terminal unit error
FF	P31	Indoor unit	Follower indoor unit error (Group error)
FFFF(-1)	-	I/F	I/F Error in the communication of BMS-IFMB0TLR-E device with the Indoor unit
FFFF(-2)	-	I/F	The BMS-IFMB0TLR-E has temporarily stopped communicating because the indoor unit or wired remote controller transmitted the system stop command.
FFFF(-4)	-	I/F	The BMS-IFMB0TLR-E is performing the initialization process.
FFFF(-5)	-	I/F	The BMS-IFMB0TLR-E has stopped communicating because the indoor unit switched to the low-power-consumption mode.

In case you detect an error code not listed, contact your nearest Toshiba technical support service.

7. Indoor Unit Address List

HEX	Address	
	Line	Unit
0800	1	1
0801	1	2
0802	1	3
0803	1	4
0804	1	5
0805	1	6
0806	1	7
0807	1	8
0808	1	9
0809	1	10
080A	1	11
080B	1	12
080C	1	13
080D	1	14
080E	1	15
080F	1	16
0810	1	17
0811	1	18
0812	1	19
0813	1	20
0814	1	21
0815	1	22
0816	1	23
0817	1	24
0818	1	25
0819	1	26
081A	1	27
081B	1	28
081C	1	29
081D	1	30
081E	1	31
081F	1	32
0820	1	33
0821	1	34
0822	1	35
0823	1	36
0824	1	37
0825	1	38
0826	1	39
0827	1	40
0828	1	41
0829	1	42

HEX	Address	
	Line	Unit
082A	1	43
082B	1	44
082C	1	45
082D	1	46
082E	1	47
082F	1	48
0830	1	49
0831	1	50
0832	1	51
0833	1	52
0834	1	53
0835	1	54
0836	1	55
0837	1	56
0838	1	57
0839	1	58
083A	1	59
083B	1	60
083C	1	61
083D	1	62
083E	1	63
083F	1	64
0840	2	1
0841	2	2
0842	2	3
0843	2	4
0844	2	5
0845	2	6
0846	2	7
0847	2	8
0848	2	9
0849	2	10
084A	2	11
084B	2	12
084C	2	13
084D	2	14
084E	2	15
084F	2	16
0850	2	17
0851	2	18
0852	2	19
0853	2	20

HEX	Address	
	Line	Unit
0854	2	21
0855	2	22
0856	2	23
0857	2	24
0858	2	25
0859	2	26
085A	2	27
085B	2	28
085C	2	29
085D	2	30
085E	2	31
085F	2	32
0860	2	33
0861	2	34
0862	2	35
0863	2	36
0864	2	37
0865	2	38
0866	2	39
0867	2	40
0868	2	41
0869	2	42
086A	2	43
086B	2	44
086C	2	45
086D	2	46
086E	2	47
086F	2	48
0870	2	49
0871	2	50
0872	2	51
0873	2	52
0874	2	53
0875	2	54
0876	2	55
0877	2	56
0878	2	57
0879	2	58
087A	2	59
087B	2	60
087C	2	61
087D	2	62

HEX	Address	
	Line	Unit
087E	2	63
087F	2	64
0880	3	1
0881	3	2
0882	3	3
0883	3	4
0884	3	5
0885	3	6
0886	3	7
0887	3	8
0888	3	9
0889	3	10
088A	3	11
088B	3	12
088C	3	13
088D	3	14
088E	3	15
088F	3	16
0890	3	17
0891	3	18
0892	3	19
0893	3	20
0894	3	21
0895	3	22
0896	3	23
0897	3	24
0898	3	25
0899	3	26
089A	3	27
089B	3	28
089C	3	29
089D	3	30
089E	3	31
089F	3	32
08A0	3	33
08A1	3	34
08A2	3	35
08A3	3	36
08A4	3	37
08A5	3	38
08A6	3	39
08A7	3	40

HEX	Address		HEX	Address	
	Line	Unit		Line	Unit
08A8	3	41	08D4	4	21
08A9	3	42	08D5	4	22
08AA	3	43	08D6	4	23
08AB	3	44	08D7	4	24
08AC	3	45	08D8	4	25
08AD	3	46	08D9	4	26
08AE	3	47	08DA	4	27
08AF	3	48	08DB	4	28
08B0	3	49	08DC	4	29
08B1	3	50	08DD	4	30
08B2	3	51	08DE	4	31
08B3	3	52	08DF	4	32
08B4	3	53	08E0	4	33
08B5	3	54	08E1	4	34
08B6	3	55	08E2	4	35
08B7	3	56	08E3	4	36
08B8	3	57	08E4	4	37
08B9	3	58	08E5	4	38
08BA	3	59	08E6	4	39
08BB	3	60	08E7	4	40
08BC	3	61	08E8	4	41
08BD	3	62	08E9	4	42
08BE	3	63	08EA	4	43
08BF	3	64	08EB	4	44
08C0	4	1	08EC	4	45
08C1	4	2	08ED	4	46
08C2	4	3	08EE	4	47
08C3	4	4	08EF	4	48
08C4	4	5	08F0	4	49
08C5	4	6	08F1	4	50
08C6	4	7	08F2	4	51
08C7	4	8	08F3	4	52
08C8	4	9	08F4	4	53
08C9	4	10	08F5	4	54
08CA	4	11	08F6	4	55
08CB	4	12	08F7	4	56
08CC	4	13	08F8	4	57
08CD	4	14	08F9	4	58
08CE	4	15	08FA	4	59
08CF	4	16	08FB	4	60
08D0	4	17	08FC	4	61
08D1	4	18	08FD	4	62
08D2	4	19	08FE	4	63
08D3	4	20	08FF	4	64

HEX	Address		HEX	Address		HEX	Address		HEX	Address	
	09	Line		Unit	09		Line	Unit		09	Line
0900	5	1	092C	5	45	0958	6	25	0984	7	5
0901	5	2	092D	5	46	0959	6	26	0985	7	6
0902	5	3	092E	5	47	095A	6	27	0986	7	7
0903	5	4	092F	5	48	095B	6	28	0987	7	8
0904	5	5	0930	5	49	095C	6	29	0988	7	9
0905	5	6	0931	5	50	095D	6	30	0989	7	10
0906	5	7	0932	5	51	095E	6	31	098A	7	11
0907	5	8	0933	5	52	095F	6	32	098B	7	12
0908	5	9	0934	5	53	0960	6	33	098C	7	13
0909	5	10	0935	5	54	0961	6	34	098D	7	14
090A	5	11	0936	5	55	0962	6	35	098E	7	15
090B	5	12	0937	5	56	0963	6	36	098F	7	16
090C	5	13	0938	5	57	0964	6	37	0990	7	17
090D	5	14	0939	5	58	0965	6	38	0991	7	18
090E	5	15	093A	5	59	0966	6	39	0992	7	19
090F	5	16	093B	5	60	0967	6	40	0993	7	20
0910	5	17	093C	5	61	0968	6	41	0994	7	21
0911	5	18	093D	5	62	0969	6	42	0995	7	22
0912	5	19	093E	5	63	096A	6	43	0996	7	23
0913	5	20	093F	5	64	096B	6	44	0997	7	24
0914	5	21	0940	6	1	096C	6	45	0998	7	25
0915	5	22	0941	6	2	096D	6	46	0999	7	26
0916	5	23	0942	6	3	096E	6	47	099A	7	27
0917	5	24	0943	6	4	096F	6	48	099B	7	28
0918	5	25	0944	6	5	0970	6	49	099C	7	29
0919	5	26	0945	6	6	0971	6	50	099D	7	30
091A	5	27	0946	6	7	0972	6	51	099E	7	31
091B	5	28	0947	6	8	0973	6	52	099F	7	32
091C	5	29	0948	6	9	0974	6	53	09A0	7	33
091D	5	30	0949	6	10	0975	6	54	09A1	7	34
091E	5	31	094A	6	11	0976	6	55	09A2	7	35
091F	5	32	094B	6	12	0977	6	56	09A3	7	36
0920	5	33	094C	6	13	0978	6	57	09A4	7	37
0921	5	34	094D	6	14	0979	6	58	09A5	7	38
0922	5	35	094E	6	15	097A	6	59	09A6	7	39
0923	5	36	094F	6	16	097B	6	60	09A7	7	40
0924	5	37	0950	6	17	097C	6	61	09A8	7	41
0925	5	38	0951	6	18	097D	6	62	09A9	7	42
0926	5	39	0952	6	19	097E	6	63	09AA	7	43
0927	5	40	0953	6	20	097F	6	64	09AB	7	44
0928	5	41	0954	6	21	0980	7	1	09AC	7	45
0929	5	42	0955	6	22	0981	7	2	09AD	7	46
092A	5	43	0956	6	23	0982	7	3	09AE	7	47
092B	5	44	0957	6	24	0983	7	4	09AF	7	48

HEX	Address		HEX	Address	
	Line	Unit		Line	Unit
09B0	7	49	09DC	8	29
09B1	7	50	09DD	8	30
09B2	7	51	09DE	8	31
09B3	7	52	09DF	8	32
09B4	7	53	09E0	8	33
09B5	7	54	09E1	8	34
09B6	7	55	09E2	8	35
09B7	7	56	09E3	8	36
09B8	7	57	09E4	8	37
09B9	7	58	09E5	8	38
09BA	7	59	09E6	8	39
09BB	7	60	09E7	8	40
09BC	7	61	09E8	8	41
09BD	7	62	09E9	8	42
09BE	7	63	09EA	8	43
09BF	7	64	09EB	8	44
09C0	8	1	09EC	8	45
09C1	8	2	09ED	8	46
09C2	8	3	09EE	8	47
09C3	8	4	09EF	8	48
09C4	8	5	09F0	8	49
09C5	8	6	09F1	8	50
09C6	8	7	09F2	8	51
09C7	8	8	09F3	8	52
09C8	8	9	09F4	8	53
09C9	8	10	09F5	8	54
09CA	8	11	09F6	8	55
09CB	8	12	09F7	8	56
09CC	8	13	09F8	8	57
09CD	8	14	09F9	8	58
09CE	8	15	09FA	8	59
09CF	8	16	09FB	8	60
09D0	8	17	09FC	8	61
09D1	8	18	09FD	8	62
09D2	8	19	09FE	8	63
09D3	8	20	09FF	8	64
09D4	8	21			
09D5	8	22			
09D6	8	23			
09D7	8	24			
09D8	8	25			
09D9	8	26			
09DA	8	27			
09DB	8	28			

HEX	Address	
	0A	Line
0A00	9	1
0A01	9	2
0A02	9	3
0A03	9	4
0A04	9	5
0A05	9	6
0A06	9	7
0A07	9	8
0A08	9	9
0A09	9	10
0A0A	9	11
0A0B	9	12
0A0C	9	13
0A0D	9	14
0A0E	9	15
0A0F	9	16
0A10	9	17
0A11	9	18
0A12	9	19
0A13	9	20
0A14	9	21
0A15	9	22
0A16	9	23
0A17	9	24
0A18	9	25
0A19	9	26
0A1A	9	27
0A1B	9	28
0A1C	9	29
0A1D	9	30
0A1E	9	31
0A1F	9	32
0A20	9	33
0A21	9	34
0A22	9	35
0A23	9	36
0A24	9	37
0A25	9	38
0A26	9	39
0A27	9	40
0A28	9	41
0A29	9	42
0A2A	9	43
0A2B	9	44

HEX	Address	
	0A	Line
0A2C	9	45
0A2D	9	46
0A2E	9	47
0A2F	9	48
0A30	9	49
0A31	9	50
0A32	9	51
0A33	9	52
0A34	9	53
0A35	9	54
0A36	9	55
0A37	9	56
0A38	9	57
0A39	9	58
0A3A	9	59
0A3B	9	60
0A3C	9	61
0A3D	9	62
0A3E	9	63
0A3F	9	64
0A40	10	1
0A41	10	2
0A42	10	3
0A43	10	4
0A44	10	5
0A45	10	6
0A46	10	7
0A47	10	8
0A48	10	9
0A49	10	10
0A4A	10	11
0A4B	10	12
0A4C	10	13
0A4D	10	14
0A4E	10	15
0A4F	10	16
0A50	10	17
0A51	10	18
0A52	10	19
0A53	10	20
0A54	10	21
0A55	10	22
0A56	10	23
0A57	10	24

HEX	Address	
	0A	Line
0A58	10	25
0A59	10	26
0A5A	10	27
0A5B	10	28
0A5C	10	29
0A5D	10	30
0A5E	10	31
0A5F	10	32
0A60	10	33
0A61	10	34
0A62	10	35
0A63	10	36
0A64	10	37
0A65	10	38
0A66	10	39
0A67	10	40
0A68	10	41
0A69	10	42
0A6A	10	43
0A6B	10	44
0A6C	10	45
0A6D	10	46
0A6E	10	47
0A6F	10	48
0A70	10	49
0A71	10	50
0A72	10	51
0A73	10	52
0A74	10	53
0A75	10	54
0A76	10	55
0A77	10	56
0A78	10	57
0A79	10	58
0A7A	10	59
0A7B	10	60
0A7C	10	61
0A7D	10	62
0A7E	10	63
0A7F	10	64
0A80	11	1
0A81	11	2
0A82	11	3
0A83	11	4

HEX	Address	
	0A	Line
0A84	11	5
0A85	11	6
0A86	11	7
0A87	11	8
0A88	11	9
0A89	11	10
0A8A	11	11
0A8B	11	12
0A8C	11	13
0A8D	11	14
0A8E	11	15
0A8F	11	16
0A90	11	17
0A91	11	18
0A92	11	19
0A93	11	20
0A94	11	21
0A95	11	22
0A96	11	23
0A97	11	24
0A98	11	25
0A99	11	26
0A9A	11	27
0A9B	11	28
0A9C	11	29
0A9D	11	30
0A9E	11	31
0A9F	11	32
0AA0	11	33
0AA1	11	34
0AA2	11	35
0AA3	11	36
0AA4	11	37
0AA5	11	38
0AA6	11	39
0AA7	11	40
0AA8	11	41
0AA9	11	42
0AAA	11	43
0AAB	11	44
0AAC	11	45
0AAD	11	46
0AAE	11	47
0AAF	11	48

HEX	Address	
	Line	Unit
0AB0	11	49
0AB1	11	50
0AB2	11	51
0AB3	11	52
0AB4	11	53
0AB5	11	54
0AB6	11	55
0AB7	11	56
0AB8	11	57
0AB9	11	58
0ABA	11	59
0ABB	11	60
0ABC	11	61
0ABD	11	62
0ABE	11	63
0ABF	11	64
0AC0	12	1
0AC1	12	2
0AC2	12	3
0AC3	12	4
0AC4	12	5
0AC5	12	6
0AC6	12	7
0AC7	12	8
0AC8	12	9
0AC9	12	10
0ACA	12	11
0ACB	12	12
0ACC	12	13
0ACD	12	14
0ACE	12	15
0ACF	12	16
0AD0	12	17
0AD1	12	18
0AD2	12	19
0AD3	12	20
0AD4	12	21
0AD5	12	22
0AD6	12	23
0AD7	12	24
0AD8	12	25
0AD9	12	26
0ADA	12	27
0ADB	12	28

HEX	Address	
	Line	Unit
0ADC	12	29
0ADD	12	30
0ADE	12	31
0ADF	12	32
0AE0	12	33
0AE1	12	34
0AE2	12	35
0AE3	12	36
0AE4	12	37
0AE5	12	38
0AE6	12	39
0AE7	12	40
0AE8	12	41
0AE9	12	42
0AEA	12	43
0AEB	12	44
0AEC	12	45
0AED	12	46
0AEE	12	47
0AEF	12	48
0AF0	12	49
0AF1	12	50
0AF2	12	51
0AF3	12	52
0AF4	12	53
0AF5	12	54
0AF6	12	55
0AF7	12	56
0AF8	12	57
0AF9	12	58
0AFA	12	59
0AFB	12	60
0AFC	12	61
0AFD	12	62
0AFE	12	63
0AFF	12	64

HEX	Address		HEX	Address		HEX	Address		HEX	Address	
	0B	Line		Unit	0B		Line	Unit		0B	Line
0B00	13	1	0B2C	13	45	0B58	14	25	0B84	15	5
0B01	13	2	0B2D	13	46	0B59	14	26	0B85	15	6
0B02	13	3	0B2E	13	47	0B5A	14	27	0B86	15	7
0B03	13	4	0B2F	13	48	0B5B	14	28	0B87	15	8
0B04	13	5	0B30	13	49	0B5C	14	29	0B88	15	9
0B05	13	6	0B31	13	50	0B5D	14	30	0B89	15	10
0B06	13	7	0B32	13	51	0B5E	14	31	0B8A	15	11
0B07	13	8	0B33	13	52	0B5F	14	32	0B8B	15	12
0B08	13	9	0B34	13	53	0B60	14	33	0B8C	15	13
0B09	13	10	0B35	13	54	0B61	14	34	0B8D	15	14
0B0A	13	11	0B36	13	55	0B62	14	35	0B8E	15	15
0B0B	13	12	0B37	13	56	0B63	14	36	0B8F	15	16
0B0C	13	13	0B38	13	57	0B64	14	37	0B90	15	17
0B0D	13	14	0B39	13	58	0B65	14	38	0B91	15	18
0B0E	13	15	0B3A	13	59	0B66	14	39	0B92	15	19
0B0F	13	16	0B3B	13	60	0B67	14	40	0B93	15	20
0B10	13	17	0B3C	13	61	0B68	14	41	0B94	15	21
0B11	13	18	0B3D	13	62	0B69	14	42	0B95	15	22
0B12	13	19	0B3E	13	63	0B6A	14	43	0B96	15	23
0B13	13	20	0B3F	13	64	0B6B	14	44	0B97	15	24
0B14	13	21	0B40	14	1	0B6C	14	45	0B98	15	25
0B15	13	22	0B41	14	2	0B6D	14	46	0B99	15	26
0B16	13	23	0B42	14	3	0B6E	14	47	0B9A	15	27
0B17	13	24	0B43	14	4	0B6F	14	48	0B9B	15	28
0B18	13	25	0B44	14	5	0B70	14	49	0B9C	15	29
0B19	13	26	0B45	14	6	0B71	14	50	0B9D	15	30
0B1A	13	27	0B46	14	7	0B72	14	51	0B9E	15	31
0B1B	13	28	0B47	14	8	0B73	14	52	0B9F	15	32
0B1C	13	29	0B48	14	9	0B74	14	53	0BA0	15	33
0B1D	13	30	0B49	14	10	0B75	14	54	0BA1	15	34
0B1E	13	31	0B4A	14	11	0B76	14	55	0BA2	15	35
0B1F	13	32	0B4B	14	12	0B77	14	56	0BA3	15	36
0B20	13	33	0B4C	14	13	0B78	14	57	0BA4	15	37
0B21	13	34	0B4D	14	14	0B79	14	58	0BA5	15	38
0B22	13	35	0B4E	14	15	0B7A	14	59	0BA6	15	39
0B23	13	36	0B4F	14	16	0B7B	14	60	0BA7	15	40
0B24	13	37	0B50	14	17	0B7C	14	61	0BA8	15	41
0B25	13	38	0B51	14	18	0B7D	14	62	0BA9	15	42
0B26	13	39	0B52	14	19	0B7E	14	63	0BAA	15	43
0B27	13	40	0B53	14	20	0B7F	14	64	0BAB	15	44
0B28	13	41	0B54	14	21	0B80	15	1	0BAC	15	45
0B29	13	42	0B55	14	22	0B81	15	2	0BAD	15	46
0B2A	13	43	0B56	14	23	0B82	15	3	0BAE	15	47
0B2B	13	44	0B57	14	24	0B83	15	4	0BAF	15	48

HEX	Address	
	Line	Unit
0BB0	15	49
0BB1	15	50
0BB2	15	51
0BB3	15	52
0BB4	15	53
0BB5	15	54
0BB6	15	55
0BB7	15	56
0BB8	15	57
0BB9	15	58
0BBA	15	59
0BBB	15	60
0BBC	15	61
0BBD	15	62
0BBE	15	63
0BBF	15	64
0BC0	16	1
0BC1	16	2
0BC2	16	3
0BC3	16	4
0BC4	16	5
0BC5	16	6
0BC6	16	7
0BC7	16	8
0BC8	16	9
0BC9	16	10
0BCA	16	11
0BCB	16	12
0BCC	16	13
0BCD	16	14
0BCE	16	15
0BCF	16	16
0BD0	16	17
0BD1	16	18
0BD2	16	19
0BD3	16	20
0BD4	16	21
0BD5	16	22
0BD6	16	23
0BD7	16	24
0BD8	16	25
0BD9	16	26
0BDA	16	27
0BDB	16	28

HEX	Address	
	Line	Unit
0BDC	16	29
0BDD	16	30
0BDE	16	31
0BDF	16	32
0BE0	16	33
0BE1	16	34
0BE2	16	35
0BE3	16	36
0BE4	16	37
0BE5	16	38
0BE6	16	39
0BE7	16	40
0BE8	16	41
0BE9	16	42
0BEA	16	43
0BEB	16	44
0BEC	16	45
0BED	16	46
0BEE	16	47
0BEF	16	48
0BF0	16	49
0BF1	16	50
0BF2	16	51
0BF3	16	52
0BF4	16	53
0BF5	16	54
0BF6	16	55
0BF7	16	56
0BF8	16	57
0BF9	16	58
0BFA	16	59
0BFB	16	60
0BFC	16	61
0BFD	16	62
0BFE	16	63
0BFF	16	64

HEX	Address		HEX	Address		HEX	Address		HEX	Address	
	0C	Line		Unit	0C		Line	Unit		0C	Line
0C00	17	1	0C2C	17	45	0C58	18	25	0C84	19	5
0C01	17	2	0C2D	17	46	0C59	18	26	0C85	19	6
0C02	17	3	0C2E	17	47	0C5A	18	27	0C86	19	7
0C03	17	4	0C2F	17	48	0C5B	18	28	0C87	19	8
0C04	17	5	0C30	17	49	0C5C	18	29	0C88	19	9
0C05	17	6	0C31	17	50	0C5D	18	30	0C89	19	10
0C06	17	7	0C32	17	51	0C5E	18	31	0C8A	19	11
0C07	17	8	0C33	17	52	0C5F	18	32	0C8B	19	12
0C08	17	9	0C34	17	53	0C60	18	33	0C8C	19	13
0C09	17	10	0C35	17	54	0C61	18	34	0C8D	19	14
0C0A	17	11	0C36	17	55	0C62	18	35	0C8E	19	15
0C0B	17	12	0C37	17	56	0C63	18	36	0C8F	19	16
0C0C	17	13	0C38	17	57	0C64	18	37	0C90	19	17
0C0D	17	14	0C39	17	58	0C65	18	38	0C91	19	18
0C0E	17	15	0C3A	17	59	0C66	18	39	0C92	19	19
0C0F	17	16	0C3B	17	60	0C67	18	40	0C93	19	20
0C10	17	17	0C3C	17	61	0C68	18	41	0C94	19	21
0C11	17	18	0C3D	17	62	0C69	18	42	0C95	19	22
0C12	17	19	0C3E	17	63	0C6A	18	43	0C96	19	23
0C13	17	20	0C3F	17	64	0C6B	18	44	0C97	19	24
0C14	17	21	0C40	18	1	0C6C	18	45	0C98	19	25
0C15	17	22	0C41	18	2	0C6D	18	46	0C99	19	26
0C16	17	23	0C42	18	3	0C6E	18	47	0C9A	19	27
0C17	17	24	0C43	18	4	0C6F	18	48	0C9B	19	28
0C18	17	25	0C44	18	5	0C70	18	49	0C9C	19	29
0C19	17	26	0C45	18	6	0C71	18	50	0C9D	19	30
0C1A	17	27	0C46	18	7	0C72	18	51	0C9E	19	31
0C1B	17	28	0C47	18	8	0C73	18	52	0C9F	19	32
0C1C	17	29	0C48	18	9	0C74	18	53	0CA0	19	33
0C1D	17	30	0C49	18	10	0C75	18	54	0CA1	19	34
0C1E	17	31	0C4A	18	11	0C76	18	55	0CA2	19	35
0C1F	17	32	0C4B	18	12	0C77	18	56	0CA3	19	36
0C20	17	33	0C4C	18	13	0C78	18	57	0CA4	19	37
0C21	17	34	0C4D	18	14	0C79	18	58	0CA5	19	38
0C22	17	35	0C4E	18	15	0C7A	18	59	0CA6	19	39
0C23	17	36	0C4F	18	16	0C7B	18	60	0CA7	19	40
0C24	17	37	0C50	18	17	0C7C	18	61	0CA8	19	41
0C25	17	38	0C51	18	18	0C7D	18	62	0CA9	19	42
0C26	17	39	0C52	18	19	0C7E	18	63	0CAA	19	43
0C27	17	40	0C53	18	20	0C7F	18	64	0CAB	19	44
0C28	17	41	0C54	18	21	0C80	19	1	0CAC	19	45
0C29	17	42	0C55	18	22	0C81	19	2	0CAD	19	46
0C2A	17	43	0C56	18	23	0C82	19	3	0CAE	19	47
0C2B	17	44	0C57	18	24	0C83	19	4	0CAF	19	48

HEX	Address		HEX	Address	
	OC	Line		Unit	OC
0CB0	19	49	0CDC	20	29
0CB1	19	50	0CDD	20	30
0CB2	19	51	0CDE	20	31
0CB3	19	52	0CDF	20	32
0CB4	19	53	0CE0	20	33
0CB5	19	54	0CE1	20	34
0CB6	19	55	0CE2	20	35
0CB7	19	56	0CE3	20	36
0CB8	19	57	0CE4	20	37
0CB9	19	58	0CE5	20	38
0CBA	19	59	0CE6	20	39
0CBB	19	60	0CE7	20	40
0CBC	19	61	0CE8	20	41
0CBD	19	62	0CE9	20	42
0CBE	19	63	0CEA	20	43
0CBF	19	64	0CEB	20	44
0CC0	20	1	0CEC	20	45
0CC1	20	2	0CED	20	46
0CC2	20	3	0CEE	20	47
0CC3	20	4	0CEF	20	48
0CC4	20	5	0CF0	20	49
0CC5	20	6	0CF1	20	50
0CC6	20	7	0CF2	20	51
0CC7	20	8	0CF3	20	52
0CC8	20	9	0CF4	20	53
0CC9	20	10	0CF5	20	54
0CCA	20	11	0CF6	20	55
0CCB	20	12	0CF7	20	56
0CCC	20	13	0CF8	20	57
0CCD	20	14	0CF9	20	58
0CCE	20	15	0CFA	20	59
0CCF	20	16	0CFB	20	60
0CD0	20	17	0CFC	20	61
0CD1	20	18	0CFD	20	62
0CD2	20	19	0CFE	20	63
0CD3	20	20	0CFF	20	64
0CD4	20	21			
0CD5	20	22			
0CD6	20	23			
0CD7	20	24			
0CD8	20	25			
0CD9	20	26			
0CDA	20	27			
0CDB	20	28			

HEX	Address		HEX	Address		HEX	Address		HEX	Address	
	0D	Line		Unit	0D		Line	Unit		0D	Line
0D00	21	1	0D2C	21	45	0D58	22	25	0D84	23	5
0D01	21	2	0D2D	21	46	0D59	22	26	0D85	23	6
0D02	21	3	0D2E	21	47	0D5A	22	27	0D86	23	7
0D03	21	4	0D2F	21	48	0D5B	22	28	0D87	23	8
0D04	21	5	0D30	21	49	0D5C	22	29	0D88	23	9
0D05	21	6	0D31	21	50	0D5D	22	30	0D89	23	10
0D06	21	7	0D32	21	51	0D5E	22	31	0D8A	23	11
0D07	21	8	0D33	21	52	0D5F	22	32	0D8B	23	12
0D08	21	9	0D34	21	53	0D60	22	33	0D8C	23	13
0D09	21	10	0D35	21	54	0D61	22	34	0D8D	23	14
0D0A	21	11	0D36	21	55	0D62	22	35	0D8E	23	15
0D0B	21	12	0D37	21	56	0D63	22	36	0D8F	23	16
0D0C	21	13	0D38	21	57	0D64	22	37	0D90	23	17
0D0D	21	14	0D39	21	58	0D65	22	38	0D91	23	18
0D0E	21	15	0D3A	21	59	0D66	22	39	0D92	23	19
0D0F	21	16	0D3B	21	60	0D67	22	40	0D93	23	20
0D10	21	17	0D3C	21	61	0D68	22	41	0D94	23	21
0D11	21	18	0D3D	21	62	0D69	22	42	0D95	23	22
0D12	21	19	0D3E	21	63	0D6A	22	43	0D96	23	23
0D13	21	20	0D3F	21	64	0D6B	22	44	0D97	23	24
0D14	21	21	0D40	22	1	0D6C	22	45	0D98	23	25
0D15	21	22	0D41	22	2	0D6D	22	46	0D99	23	26
0D16	21	23	0D42	22	3	0D6E	22	47	0D9A	23	27
0D17	21	24	0D43	22	4	0D6F	22	48	0D9B	23	28
0D18	21	25	0D44	22	5	0D70	22	49	0D9C	23	29
0D19	21	26	0D45	22	6	0D71	22	50	0D9D	23	30
0D1A	21	27	0D46	22	7	0D72	22	51	0D9E	23	31
0D1B	21	28	0D47	22	8	0D73	22	52	0D9F	23	32
0D1C	21	29	0D48	22	9	0D74	22	53	0DA0	23	33
0D1D	21	30	0D49	22	10	0D75	22	54	0DA1	23	34
0D1E	21	31	0D4A	22	11	0D76	22	55	0DA2	23	35
0D1F	21	32	0D4B	22	12	0D77	22	56	0DA3	23	36
0D20	21	33	0D4C	22	13	0D78	22	57	0DA4	23	37
0D21	21	34	0D4D	22	14	0D79	22	58	0DA5	23	38
0D22	21	35	0D4E	22	15	0D7A	22	59	0DA6	23	39
0D23	21	36	0D4F	22	16	0D7B	22	60	0DA7	23	40
0D24	21	37	0D50	22	17	0D7C	22	61	0DA8	23	41
0D25	21	38	0D51	22	18	0D7D	22	62	0DA9	23	42
0D26	21	39	0D52	22	19	0D7E	22	63	0DAA	23	43
0D27	21	40	0D53	22	20	0D7F	22	64	0DAB	23	44
0D28	21	41	0D54	22	21	0D80	23	1	0DAC	23	45
0D29	21	42	0D55	22	22	0D81	23	2	0DAD	23	46
0D2A	21	43	0D56	22	23	0D82	23	3	0DAE	23	47
0D2B	21	44	0D57	22	24	0D83	23	4	0DAF	23	48

HEX	Address		HEX	Address	
	0D	Line		Unit	0D
0DB0	23	49	0DDC	24	29
0DB1	23	50	0DDD	24	30
0DB2	23	51	0DDE	24	31
0DB3	23	52	0DDF	24	32
0DB4	23	53	0DE0	24	33
0DB5	23	54	0DE1	24	34
0DB6	23	55	0DE2	24	35
0DB7	23	56	0DE3	24	36
0DB8	23	57	0DE4	24	37
0DB9	23	58	0DE5	24	38
0DBA	23	59	0DE6	24	39
0DBB	23	60	0DE7	24	40
0DBC	23	61	0DE8	24	41
0DBD	23	62	0DE9	24	42
0DBE	23	63	0DEA	24	43
0DBF	23	64	0DEB	24	44
0DC0	24	1	0DEC	24	45
0DC1	24	2	0DED	24	46
0DC2	24	3	0DEE	24	47
0DC3	24	4	0DEF	24	48
0DC4	24	5	0DF0	24	49
0DC5	24	6	0DF1	24	50
0DC6	24	7	0DF2	24	51
0DC7	24	8	0DF3	24	52
0DC8	24	9	0DF4	24	53
0DC9	24	10	0DF5	24	54
0DCA	24	11	0DF6	24	55
0DCB	24	12	0DF7	24	56
0DCC	24	13	0DF8	24	57
0DCD	24	14	0DF9	24	58
0DCE	24	15	0DFA	24	59
0DCF	24	16	0DFB	24	60
0DD0	24	17	0DFC	24	61
0DD1	24	18	0DFD	24	62
0DD2	24	19	0DFE	24	63
0DD3	24	20	0DFF	24	64
0DD4	24	21			
0DD5	24	22			
0DD6	24	23			
0DD7	24	24			
0DD8	24	25			
0DD9	24	26			
0DDA	24	27			
0ddb	24	28			

HEX	Address		HEX	Address		HEX	Address		HEX	Address	
	0E	Line		Unit	0E		Line	Unit		0E	Line
0E00	25	1	0E2C	25	45	0E58	26	25	0E84	27	5
0E01	25	2	0E2D	25	46	0E59	26	26	0E85	27	6
0E02	25	3	0E2E	25	47	0E5A	26	27	0E86	27	7
0E03	25	4	0E2F	25	48	0E5B	26	28	0E87	27	8
0E04	25	5	0E30	25	49	0E5C	26	29	0E88	27	9
0E05	25	6	0E31	25	50	0E5D	26	30	0E89	27	10
0E06	25	7	0E32	25	51	0E5E	26	31	0E8A	27	11
0E07	25	8	0E33	25	52	0E5F	26	32	0E8B	27	12
0E08	25	9	0E34	25	53	0E60	26	33	0E8C	27	13
0E09	25	10	0E35	25	54	0E61	26	34	0E8D	27	14
0E0A	25	11	0E36	25	55	0E62	26	35	0E8E	27	15
0E0B	25	12	0E37	25	56	0E63	26	36	0E8F	27	16
0E0C	25	13	0E38	25	57	0E64	26	37	0E90	27	17
0E0D	25	14	0E39	25	58	0E65	26	38	0E91	27	18
0E0E	25	15	0E3A	25	59	0E66	26	39	0E92	27	19
0E0F	25	16	0E3B	25	60	0E67	26	40	0E93	27	20
0E10	25	17	0E3C	25	61	0E68	26	41	0E94	27	21
0E11	25	18	0E3D	25	62	0E69	26	42	0E95	27	22
0E12	25	19	0E3E	25	63	0E6A	26	43	0E96	27	23
0E13	25	20	0E3F	25	64	0E6B	26	44	0E97	27	24
0E14	25	21	0E40	26	1	0E6C	26	45	0E98	27	25
0E15	25	22	0E41	26	2	0E6D	26	46	0E99	27	26
0E16	25	23	0E42	26	3	0E6E	26	47	0E9A	27	27
0E17	25	24	0E43	26	4	0E6F	26	48	0E9B	27	28
0E18	25	25	0E44	26	5	0E70	26	49	0E9C	27	29
0E19	25	26	0E45	26	6	0E71	26	50	0E9D	27	30
0E1A	25	27	0E46	26	7	0E72	26	51	0E9E	27	31
0E1B	25	28	0E47	26	8	0E73	26	52	0E9F	27	32
0E1C	25	29	0E48	26	9	0E74	26	53	0EA0	27	33
0E1D	25	30	0E49	26	10	0E75	26	54	0EA1	27	34
0E1E	25	31	0E4A	26	11	0E76	26	55	0EA2	27	35
0E1F	25	32	0E4B	26	12	0E77	26	56	0EA3	27	36
0E20	25	33	0E4C	26	13	0E78	26	57	0EA4	27	37
0E21	25	34	0E4D	26	14	0E79	26	58	0EA5	27	38
0E22	25	35	0E4E	26	15	0E7A	26	59	0EA6	27	39
0E23	25	36	0E4F	26	16	0E7B	26	60	0EA7	27	40
0E24	25	37	0E50	26	17	0E7C	26	61	0EA8	27	41
0E25	25	38	0E51	26	18	0E7D	26	62	0EA9	27	42
0E26	25	39	0E52	26	19	0E7E	26	63	0EAA	27	43
0E27	25	40	0E53	26	20	0E7F	26	64	0EAB	27	44
0E28	25	41	0E54	26	21	0E80	27	1	0EAC	27	45
0E29	25	42	0E55	26	22	0E81	27	2	0EAD	27	46
0E2A	25	43	0E56	26	23	0E82	27	3	0EAE	27	47
0E2B	25	44	0E57	26	24	0E83	27	4	0EAF	27	48

HEX	Address	
	Line	Unit
0EB0	27	49
0EB1	27	50
0EB2	27	51
0EB3	27	52
0EB4	27	53
0EB5	27	54
0EB6	27	55
0EB7	27	56
0EB8	27	57
0EB9	27	58
0EBA	27	59
0EBB	27	60
0EBC	27	61
0EBD	27	62
0EBE	27	63
0EBF	27	64
0EC0	28	1
0EC1	28	2
0EC2	28	3
0EC3	28	4
0EC4	28	5
0EC5	28	6
0EC6	28	7
0EC7	28	8
0EC8	28	9
0EC9	28	10
0ECA	28	11
0ECB	28	12
0ECC	28	13
0ECD	28	14
0ECE	28	15
0ECF	28	16
0ED0	28	17
0ED1	28	18
0ED2	28	19
0ED3	28	20
0ED4	28	21
0ED5	28	22
0ED6	28	23
0ED7	28	24
0ED8	28	25
0ED9	28	26
0EDA	28	27
0EDB	28	28

HEX	Address	
	Line	Unit
0EDC	28	29
0EDD	28	30
0EDE	28	31
0EDF	28	32
0EE0	28	33
0EE1	28	34
0EE2	28	35
0EE3	28	36
0EE4	28	37
0EE5	28	38
0EE6	28	39
0EE7	28	40
0EE8	28	41
0EE9	28	42
0EEA	28	43
0EEB	28	44
0EEC	28	45
0EED	28	46
0EEE	28	47
0EEF	28	48
0EF0	28	49
0EF1	28	50
0EF2	28	51
0EF3	28	52
0EF4	28	53
0EF5	28	54
0EF6	28	55
0EF7	28	56
0EF8	28	57
0EF9	28	58
0EFA	28	59
0EFB	28	60
0EFC	28	61
0EFD	28	62
0EFE	28	63
0EFF	28	64

HEX	Address		HEX	Address		HEX	Address		HEX	Address	
	0F	Line		Unit	0F		Line	Unit		0F	Line
0F00	29	1	0F2C	29	45	0F58	30	25	0F84	31	5
0F01	29	2	0F2D	29	46	0F59	30	26	0F85	31	6
0F02	29	3	0F2E	29	47	0F5A	30	27	0F86	31	7
0F03	29	4	0F2F	29	48	0F5B	30	28	0F87	31	8
0F04	29	5	0F30	29	49	0F5C	30	29	0F88	31	9
0F05	29	6	0F31	29	50	0F5D	30	30	0F89	31	10
0F06	29	7	0F32	29	51	0F5E	30	31	0F8A	31	11
0F07	29	8	0F33	29	52	0F5F	30	32	0F8B	31	12
0F08	29	9	0F34	29	53	0F60	30	33	0F8C	31	13
0F09	29	10	0F35	29	54	0F61	30	34	0F8D	31	14
0F0A	29	11	0F36	29	55	0F62	30	35	0F8E	31	15
0F0B	29	12	0F37	29	56	0F63	30	36	0F8F	31	16
0F0C	29	13	0F38	29	57	0F64	30	37	0F90	31	17
0F0D	29	14	0F39	29	58	0F65	30	38	0F91	31	18
0F0E	29	15	0F3A	29	59	0F66	30	39	0F92	31	19
0F0F	29	16	0F3B	29	60	0F67	30	40	0F93	31	20
0F10	29	17	0F3C	29	61	0F68	30	41	0F94	31	21
0F11	29	18	0F3D	29	62	0F69	30	42	0F95	31	22
0F12	29	19	0F3E	29	63	0F6A	30	43	0F96	31	23
0F13	29	20	0F3F	29	64	0F6B	30	44	0F97	31	24
0F14	29	21	0F40	30	1	0F6C	30	45	0F98	31	25
0F15	29	22	0F41	30	2	0F6D	30	46	0F99	31	26
0F16	29	23	0F42	30	3	0F6E	30	47	0F9A	31	27
0F17	29	24	0F43	30	4	0F6F	30	48	0F9B	31	28
0F18	29	25	0F44	30	5	0F70	30	49	0F9C	31	29
0F19	29	26	0F45	30	6	0F71	30	50	0F9D	31	30
0F1A	29	27	0F46	30	7	0F72	30	51	0F9E	31	31
0F1B	29	28	0F47	30	8	0F73	30	52	0F9F	31	32
0F1C	29	29	0F48	30	9	0F74	30	53	0FA0	31	33
0F1D	29	30	0F49	30	10	0F75	30	54	0FA1	31	34
0F1E	29	31	0F4A	30	11	0F76	30	55	0FA2	31	35
0F1F	29	32	0F4B	30	12	0F77	30	56	0FA3	31	36
0F20	29	33	0F4C	30	13	0F78	30	57	0FA4	31	37
0F21	29	34	0F4D	30	14	0F79	30	58	0FA5	31	38
0F22	29	35	0F4E	30	15	0F7A	30	59	0FA6	31	39
0F23	29	36	0F4F	30	16	0F7B	30	60	0FA7	31	40
0F24	29	37	0F50	30	17	0F7C	30	61	0FA8	31	41
0F25	29	38	0F51	30	18	0F7D	30	62	0FA9	31	42
0F26	29	39	0F52	30	19	0F7E	30	63	0FAA	31	43
0F27	29	40	0F53	30	20	0F7F	30	64	0FAB	31	44
0F28	29	41	0F54	30	21	0F80	31	1	0FAC	31	45
0F29	29	42	0F55	30	22	0F81	31	2	0FAD	31	46
0F2A	29	43	0F56	30	23	0F82	31	3	0FAE	31	47
0F2B	29	44	0F57	30	24	0F83	31	4	0FAF	31	48

HEX	Address	
	Line	Unit
0FB0	31	49
0FB1	31	50
0FB2	31	51
0FB3	31	52
0FB4	31	53
0FB5	31	54
0FB6	31	55
0FB7	31	56
0FB8	31	57
0FB9	31	58
0FBA	31	59
0FBB	31	60
0FBC	31	61
0FBD	31	62
0FBE	31	63
0FBF	31	64
0FC0	32	1
0FC1	32	2
0FC2	32	3
0FC3	32	4
0FC4	32	5
0FC5	32	6
0FC6	32	7
0FC7	32	8
0FC8	32	9
0FC9	32	10
0FCA	32	11
0FCB	32	12
0FCC	32	13
0FCD	32	14
0FCE	32	15
0FCF	32	16
0FD0	32	17
0FD1	32	18
0FD2	32	19
0FD3	32	20
0FD4	32	21
0FD5	32	22
0FD6	32	23
0FD7	32	24
0FD8	32	25
0FD9	32	26
0FDA	32	27
0FDB	32	28

HEX	Address	
	Line	Unit
0FDC	32	29
0FDD	32	30
0FDE	32	31
0FDF	32	32
0FE0	32	33
0FE1	32	34
0FE2	32	35
0FE3	32	36
0FE4	32	37
0FE5	32	38
0FE6	32	39
0FE7	32	40
0FE8	32	41
0FE9	32	42
0FEA	32	43
0FEB	32	44
0FEC	32	45
0FED	32	46
0FEE	32	47
0FEF	32	48
0FF0	32	49
0FF1	32	50
0FF2	32	51
0FF3	32	52
0FF4	32	53
0FF5	32	54
0FF6	32	55
0FF7	32	56
0FF8	32	57
0FF9	32	58
0FFA	32	59
0FFB	32	60
0FFC	32	61
0FFD	32	62
0FFE	32	63
0FFF	32	64

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